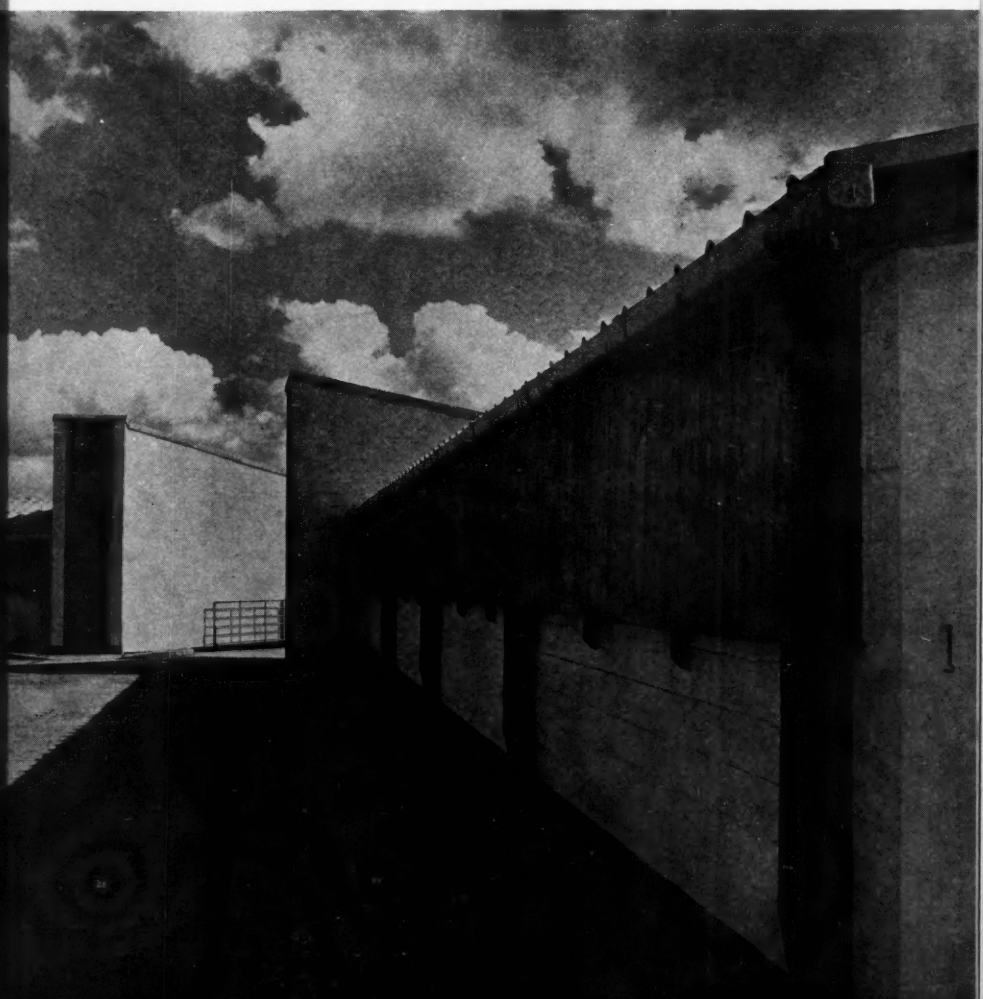
agriculture

Vol. 76 No. 3 March 1969

Published for the Ministry of Agriculture, Fisheries and Food
by Her Majesty's Stationery Office

1s. 3d.
MONTHLY



Modern Farm Buildings page 117

OFFICIAL APPOINTMENTS

General agriculturists and agricultural specialists of many kinds are frequently required in the effort to match the large demand from the developing countries. The vacancies advertised below are a selection from the many openings which exist now. While they are being filled, other vacancies are arising.

Salaries within the ranges quoted are assessed on qualifications and experience; and the terms of most appointments include free or subsidised accommodation, education grants, family passages, good leave on full pay, etc. A contributory pension scheme is available in certain circumstances.

Most appointments are limited to candidates who should be citizens of, and normally resident in, the United Kingdom.

FIJI

Soil Conservation Officer

RC 213/62/07

Duties: Supervision and maintenance of technical standards in soil conservation work, by liaison with District Agricultural Officers who administer all soil conservation extension, machinery and field staff. Arrange in-service training in soil conservation for field staff. Prepare lectures and examinations for the soil conservation course at the Fiji School of Agriculture. Assist in preparation of soil conservation publicity. Advise on soil conservation matters through the Director of Agriculture or through the Land Conservation Board.

Qualifications: A degree in Agriculture or Science with experience in practical soil conservation. Experience in tropical agriculture is desirable. Salary: Basic, £ Fijian 1,092—2,181 (£ Sterling 1,045—2,087) p.a. An inducement allowance normally tax free in the range £ Sterling 508—829 p.a. is also payable direct to an officer's home bank account. Gratuity 25%. Contract 30–36 months.

JORDAN

Farm Settlement Adviser

RC 213/94/01

Duties: To be responsible for the layout of irrigated settlements in a Bedouin Settlement Scheme and the general management of their crops.

Qualifications: A degree in Agriculture with practical experience in irrigation and the use of machinery. Salary: £2,500—£3,000 p.a. according to experience and qualifications, subject to British Income Tax, plus a variable non-taxable overseas allowance ranging from £495—£1,125 p.a. depending on marital status. Single man preferred as mainly field work. Contract—2 years.

KENYA

(1) Agricultural Officers

RC 213/95/026

Required to work on land settlement extension and to help with the training of local agricultural extension staff.

Qualifications: A degree or diploma in Agriculture with emphasis on Animal Husbandry and experience in agricultural extension work on both crops and animal production.

(2) Senior Agricultural Officer

RC 213/95/025

Required for land settlement extension work, especially the training of local agricultural extension staff.

Qualifications: A degree in Agriculture with post-graduate training in tropical agriculture and considerable experience in agricultural extension. A knowledge of animal husbandry is essential.

OFFICIAL APPOINTMENTS

(3) Farm Machinery Adviser

RC 213/95/028

Duties: To assist and advise the local contract officer on matters connected with: organisation of work for tractors on loan; training in the maintenance of tractors and equipment; basic for integration of individual contractors with government tractor hire service; supervision of the training of potential contractors.

Qualifications: A degree in Agricultural Engineering (Farm Mechanisation) plus not less than 5 years' experience in an executive position on a mixed farming unit; a knowledge of the principles of business organisation would be an advantage.

Salaries: (1) £1,500—£2,500 p.a. (2) £2,500—£3,000 p.a. (3) £1,750—£2,500 p.a. according to experience and qualifications subject to British Income Tax plus a variable non-taxable overseas allowance ranging from (1) £500—£1,080 p.a. (2) £525—£1,095 p.a. (3) £510—£1,080 p.a. depending on marital status. Contracts—2 years.

MALAWI

(1) Agricultural Research Officer (Rice Agronomist)

RC 213/134/016

Required to draw up and execute a programme investigating all aspects of rice agronomy under rain-fed and irrigated conditions.

Qualifications: A degree in Agriculture with preferably experience in field experimentation.

(2) Agricultural Officer (Land Use)

RC 213/134/027

Duties: The survey, design and layout of soil conservation works, land use classification and farm planning, and the training of junior staff.

Qualifications: Degree in Agriculture or related subject, preferably with experience in land use planning and conservation in tropical countries. Salaries: (1) £1,485—£2,600 p.a. (2) £1,420—£2,600 p.a. In addition a supplement of £100 p.a. is payable direct to the officer's bank account outside Malawi and Rhodesia. Contracts 2–3 years. Tax free gratuities 15%—25%.

ZAMBIA

(1) Agricultural Officer (Training)

RC 213/132/022

Duties: To direct and organize staff training and short courses for farmers at farm institutes and farm training centres.

Qualifications: A degree in Agriculture with experience in advisory work.

(2) Planning Officers

RC 213/132/05

Duties: To take charge of field planning teams and to be responsible for regional conservation planning on a catchment and/or settlement plan basis.

Qualifications: A degree in Agriculture of Natural Science, preferably with relevant post-graduate training and/or experience.

(3) Animal Husbandry Officer

RC 213/132/023

Duties: To plan and promote the development of the animal husbandry industry, to train extension staff in production and management practices and manage pilot ranching schemes.

Qualifications: A degree in Agriculture with experience in animal husbandry work. Salaries: Kwacha £1,944—4,464 (£ Sterling 1,134—2,604) p.a. plus an inducement allowance in the range £243—£429 p.a. A supplement in the range £233—£291 p.a. also payable direct to an officer's bank account outside Zambia. Gratuity 25%. Both supplement and gratuity are tax free. Contracts—3 years.

If you wish to apply for any of these appointments, or you are interested generally in an appointment overseas, please write giving your full name, age and brief particulars of your professional qualifications and experience to the:

Appointments Officer
MINISTRY OF OVERSEAS DEVELOPMENT
Room 330a, Eland House, Stag Place,
London, S.W.1.

MINISTRY OF OVERSEAS DEVELOPMENT

The Long Munchtime for cows.

Ted Green is a tenant of the Leconfield Estate, and he's farming 408 acres at North Chapel in West Sussex.

Over 120 of those acres are grassland, and 66 are reserved for Ted's dairy herd.

He has 60 cows, and he's chalking up a gross margin of £109 per head.

That's intensive farming. And profitable too. Ted uses a lot of 'Nitram'–315 units per acre–to keep up the superb quality and quantity of his grass. And to stretch the outdoor grazing season as far as possible.

ICI have experience, down in the South West, of lucky cows chomping away in thick nourishing grass from mid-February till mid-November.

Naturally, as one goes further North, the period may shorten a bit. But the story is the same: intelligent use of 'Nitram' or 'Nitro-Chalk' plus one of ICI's range of High-N Compound fertilizers can extend early or late bite.

If you want to know how 'Nitram' and 'Nitro-Chalk' can benefit your grassland programme, ask the Fertility People: your local ICI technical representative or appointed ICI merchant.

And talk to them soon.

Because they can give you some really profitable advice.

Loaded with bite.

ICI The Fertility People.

Mike Smith B.A. Ag. (Cantab.)
ICI Technical Sales Rep. West Sussex.
Mike is 31, has been with ICI for 8 years. Started off as Development Officer in Cheshire, had a spell with Plant Protection in the Fens, before becoming Technical Sales Rep. in West Sussex.
Mike says: "We're trying to promote sensible use of fertilizer, not just intensive use. Especially when farmers are facing falling yields."
He's married, has two boys and lives at Cold Waltham, Sussex. An eight-handicap golfer, he also finds time to be a keen youth club leader.

Richard Thomson N.D.A. C.D.F.M.
25 year old ICI Development Officer.
Joined ICI in '66, after 2 years on farm and Seale-Hayne Ag. Coll.
Spent a year at Henley Manor concentrating on intensive dairy and beef farming.
Now operates in Hants and Sussex.
Says Richard: "We can provide forward planning for the gradual expansion of farm business even now, when farmers' profits are being squeezed."
Richard is married, lives in East Meon, and divides his spare time between squash and constructing elaborate hi-fi.

Ted Green, Farmer.
At Mitchell Park Farm, West Sussex for 4 years. Previously intensive dairy farming in Berks.
Married, with son and daughter. Son just following in father's footsteps.
Mitchell Park Farm is recorded by ICI.
Ted says: "I've been working along with ICI for 22 years, and we've made a lot of progress together."

APPOINTMENTS

WESTERN AUSTRALIAN INSTITUTE OF TECHNOLOGY

MURESK AGRICULTURAL COLLEGE

A department of the Institute (situated approximately 60 miles from Perth)

PRINCIPAL

A key position is available for an energetic and enthusiastic man to take a leading part in the projected developments arising from the incorporation of the College within the Institute, which is the major tertiary educational organisation in the State outside the University. The Principal will be head of the Department of Agriculture of the Institute. Applicants should be highly qualified in an appropriate field and preferably have had experience in both farm operation and agricultural education.

Salary range: $A8,200—$A8,600—$A9,000

An allowance of $A500 per annum will also be paid for responsibilities in connection with the running of the associated farm and the residential facilities.

Placement and advancement in the salary scale are subject to the decision of Council.

Revision of salaries in the Institute, as in other similar institutions in Australia, is at present under consideration.

A house is provided for the successful applicant at a reasonable rental.

A memorandum of information detailing conditions of service and method of application is available from:

Agent General for Western Australia,
115 Strand, London, W.C.2.

with whom applications close on Wednesday, 26th March, 1969.

POTATO MARKETING BOARD

AGRICULTURAL MACHINERY OFFICER

The Potato Marketing Board wishes to appoint a Machinery Officer, whose duties will consist broadly of the provision of advice in relation to the developments and use of machinery in the potato industry. He should have either an agricultural engineering qualification or, alternatively, appropriate experience in this field.

The post is likely to be based on the Board's Experimental Station at Sutton Bridge, but extensive travelling will be required from time to time. Salary will be open to negotiation but will be in the region of £2,000 per annum.

Applications stating age, experience and qualifications should be made to the Establishment Officer, Potato Marketing Board, 50 Hans Crescent, London S.W.1.

Agriculture

VOLUME 76 . NUMBER 3 . MARCH 1969

Editorial Offices
Ministry of Agriculture, Fisheries and Food
Whitehall Place, London, S.W.1.

Contents

	page
Mercury Tolerance in Leaf Spot of Oats *A. Bainbridge*	97
Farm Produce for the Supermarkets *R. W. Stephenson*	99
Plastic Structures *E. N. Thorpe*	102
Fat Lamb Marketing in Montgomeryshire *H. E. G. Morgan*	107
Eggs in Caernarvonshire *M. P. S. Haywood*	111
Co-operation in Road Making *D. A. B. Parsons*	114
MODERN FARM BUILDINGS	
Appearance of Farm Buildings *John B. Weller*	118
Modern Materials for Farm Buildings *J. D. Young*	126
Organization of Markets for Beef and Veal in the Common Market *R. C. Rickard*	133
Disposal of Farm Waste—Mechanization *Warner K. Hall*	137
Farming Cameo Series 4: 21. West Huntingdonshire *A. N. Chamberlain*	141
From the ALS: Housing the Bull Beef Herd *E. Dunmore*	143
In brief	146
Agricultural Chemicals Approval Scheme	148
Book Reviews	149
Ministry's Publications	154

© *Crown copyright 1969*

Provided that the source is acknowledged in each instance such articles and notes as are published in this Journal without any specific reservation regarding copyright may be produced in any registered newspaper or public periodical without special permission. The Ministry does not accept responsibility for statements made, or views expressed, in signed contributions to this Journal or in those reproduced from another source.

Further, the Ministry does not accept responsibility for any of the private and trade advertisements included in this publication.

In the interests of factual reporting, occasiona reference in this Journal to trade names and proprietary products may be inevitable. No endorsement of named products is intended, nor is any criticism implied of similar products which are not mentioned.

All communications respecting advertising in the Journal should be addressed to the Advertisement Contractors, Cowlishaw and Lawrence (Advertising) Ltd., 2-4 Ludgate Circus Buildings, London E.C.4. Telephone: 01-248 3718.

FREE! An authoritative new handbook on Farm Feed Preparation

Easily the most comprehensive free handbook on the subject and fully illustrated too. Prepared by the Electricity Council and agricultural experts it is an up-to-date guide to the practical design of electrical installations for milling, rolling, mixing, and pelleting. There's a chapter on continuous flow milling and mixing, a section giving suggested layouts to suit all purposes, and a metric conversion table. Get your free copy from your Electricity Board, or post coupon to the

Electricity Council,
Marketing Department,
Trafalgar Buildings,
1 Charing Cross, London
SW1. Tel: 01-930 6757.

Better Feeds are Electric

Post today.
Please send me your Farm Handbook on 'Feed Preparation'.

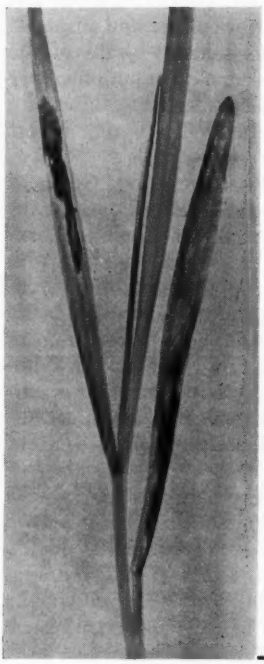
NAME.....

ADDRESS.....

.....

.....

Issued by the Electricity Council, England and Wales
FP 6



Seedlings showing lesions most typical of the disease

Mercury Tolerance in Leaf Spot of Oats

A. Bainbridge

THE seedborne fungus *Pyrenophora avenae** causes seedling blight and leaf spot disease in oats. Infected seed carries the fungus on the grain surface, beneath the husks, and it is from here that the shoot becomes infected during seed germination.

Each seedling shoot consists of an outer sheath (the coleoptile) containing the young leaves folded lengthwise one within the other. Disease severity is determined by the degree to which *P. avenae* is able to penetrate the coleoptile and successive leaves within the shoot. Extensive infection can so weaken the shoot that it either fails to emerge from the soil or is killed soon after emergence, thus causing seedling blight. When fungal penetration is less severe, the seedling emerges normally but the leaves as they expand show the infected areas as reddish brown stripes or spots, resulting in the characteristic leaf spot symptoms (see photograph above).

Seedling blight is most prevalent in cold seasons when seedling emergence is slow, allowing an extended period for spread of the fungus within the infected shoot. Delaying sowing to a later date, when a warmer seedbed could be expected to give more rapid shoot growth, would reduce the likelihood of seedling blight, but this practice is not recommended as delayed planting carries with it increased risk of serious frit-fly attack.

*Perhaps better known by the old name for the conidial state, *Helminthosporium avenae*.

Organo-mercury seed dressings have in the past provided excellent protection against attack by *P. avenae*, but in recent years numerous oat crops throughout Britain have developed leaf spot disease even though planted with dressed seed, suggesting that the organo-mercurials had become less effective in controlling the fungus. This suspicion was confirmed when Dr. Mary Noble and co-workers in the Department of Agriculture and Fisheries for Scotland reported in, 1966, finding a mercury-tolerant strain of the fungus, i.e., a strain which could grow in the presence of organo-mercury seed dressing. Applying mercury dressings to seed oats carrying this strain of the fungus gave negligible control of leaf spot. In 1968, a similar report was made from Ulster by Dr. J. P. Malone.

During 1967–68 plant pathologists in the Yorks./Lancs. and Northern Regions of the National Agricultural Advisory Service examined oats for the presence of the fungus. Of thirty-seven samples of seed oats grown in Yorkshire and Lancashire thirty-four were infected with *P. avenae*, eighteen with the mercury-tolerant strain. In the Northern Region, of twenty-three seedling oat crops examined twenty-one were infected, the tolerant strain being present on fifteen. In addition, in the East Midland Region, three oat crops which had a high incidence of leaf spot were tested by Dr. Noble in Edinburgh and found to be infected with the mercury-tolerant strain. The occurrence of this strain of the fungus in areas where oats have been examined for its presence, suggests that it is widespread in all oat-growing districts of Britain.

It would be wrong to assume that organo-mercury treatment of oat seed can be discontinued now that a mercury-tolerant strain of *P. avenae* is known to exist. Emphasis must be given to the undiminished effectiveness of mercury dressings against loose and covered smuts of oats, and against the fungus *Fusarium nivale*, another cause of seedling blight. These are potentially serious diseases which warrant the continued use of organo-mercurials on seed. In the meantime the discovery of this strain of *P. avenae* has led to a more intense search for new non-mercurial dressings effective against seedborne diseases.

I wish to thank plant pathologists in the National Agricultural Advisory Service who supplied information contained in this note.

References:

MALONE, J. P. 1968: Mercury-resistant *Pyrenophora avenae* in Northern Ireland seed oats *Pl. Path* 17 : 41–45.

NOBLE, M., MACGARVIE, Q. D., HAMS, A. F., LEAFE, E. L. 1966: Resistance to mercury of *Pyrenophora avenae* in Scottish seed oats *Pl. Path* 15 : 23–28.

This article has been contributed by **A. Bainbridge, B.Sc. (Hons.), Ph.D.**, a plant pathologist with the National Agricultural Advisory Service at the Regional Headquarters, Newcastle upon Tyne.

Front cover photograph shows calf houses at Warren Farm, Lambourne, Berks: timber portal frame with projecting baffled air extract vents (clad in timber) and Snowcemed block cavity walls: asbestos-cement gutters.

The Executive Director of the Institute of Food Distribution discusses farm produce and the changing scene of the retail market

Farm Produce for the Supermarkets

R. W. Stephenson

TODAY, everybody has a fair concept of what a supermarket is and of the layout and the range of goods they can expect to find there. What is perhaps not so well known is that since its beginning in the 1950s this particular form of retailing has captured about 25 per cent of all sales through grocery outlets and that, taken together with self-service stores, accounts for some 60 per cent of all such sales. Some experts estimate that this figure will eventually rise to 90 per cent and it is clear that increasing attention will have to be paid by food producers and manufacturers to the needs of this market.

The first point to bear in mind is that the vast majority (some 94 per cent), of the supermarkets and self-service stores are served by the 1,200 odd buying points controlled by multiple organizations, the co-operative stores and voluntary groups (such as SPAR, VIVO, MACE) which account for nearly three-quarters of all sales through grocery outlets. Because of this concentration of buying power and also of fierce competition throughout food distribution, whether in retail, wholesale, or the supply sector, the buyers, i.e., the retail organizations in particular and, possibly to a lesser degree, wholesalers, are in a very strong position. They require increasingly that goods and delivery schedules should conform to their needs as they see them.

For the manufacturer of nationally branded products there is obviously a good deal of give and take. What the retailers would like, is balanced against the economies which can be achieved only through the national promotion of a known and respected product, where the brand name is the guarantee of quality. But for the agricultural producer, dependent on the weather and a number of other variable elements, the problems take on a different dimension. There are three aspects of the changing scene which he needs to understand. Each in its way leads to the next:

1. the increasing preference, created largely by the supermarket, for one-stop shopping for items which have to be bought at regular intervals for running the house;
2. the consequent increase of self-service selling through units large and small;

3. following upon the increase in self-service selling, the retailer's requirement for a reliable supply of goods of an even quality.

The growing preference for one-stop shopping has led to a demand for even the smaller self-service shops to carry a limited range of items which they would not normally have handled. For example, the 1967 figures showed that 70 per cent of self-service grocery shops stocked fresh fruit and vegetables and 23 per cent fresh meat. This means that these items are offered for sale virtually alongside and in direct competition with branded frozen and tinned alternatives. They must, therefore, be as visually attractive and competitive in price.

The basis of self-service selling is that the goods must be presented and, where appropriate, packaged, in such a way that they sell themselves. There is no one there to say, 'They may look a little rough, madam, but I have tried them and I know they eat well and are good value'. Therefore, if the producer wishes to sell his goods through these types of outlet he needs to know what it is that the housewife requires: the colour is important in nearly all fruits, vegetables and fresh meats, also freshness and reasonable keeping time when she takes the goods home; the right size for such things as apples, cauliflowers, etc.; the proportion of fat to lean and the texture of meat. There are many other ingredients which in her mind help her to decide what she considers good quality and good value and, therefore, whether or not she will buy.

The last of the three important factors for suppliers—a constant supply of goods of an even quality—again poses particular problems for the supplier of agricultural and horticultural produce. It is possible to grade many fresh fruits and vegetables, and grades have already been laid down which are enforced at the wholesale stage for apples, pears, cauliflowers, cucumbers and tomatoes. These are a great help to the large retailer who can now buy the grade he wants from a sample. But at the same time it confronts the grower with the additional expense of grading and, in some cases, packaging, and leads one to the question of how best to dispose of those grades which are not up to the standards required for self-service selling.

Part of the answer lies in research into what the market really wants. For example, is the customer prepared to pay an adequate premium to cover the cost of sorting *extra class* apples and pears, or is it more economical to leave *extra class* and *class 1* together, *class 1* being considered by the majority of retailers to be the minimum standard required for self-service selling. In the field of meat the University of Newcastle-upon-Tyne has completed a series of studies on consumer preferences for beef steaks and price premiums for quality beef steaks, which help to identify the characteristics of beef steaks, important in consumers' estimates of quality, and the extent of the premium the housewife is prepared to pay to get what she considers to be the best.

This sort of study points to the need for research going right back to the farm gate. For example, whether certain breeds and certain feeding techniques produce more, or a higher proportion of, the qualities for which the customer is looking; whether certain varieties of fruits and vegetables provide more of the grades required for self-service selling and whether central grading and packaging is practical and desirable as a means of keeping overheads to a minimum and of taking advantage of the latest packaging techniques.

A good deal of work is being done in these fields, and one of the early tasks of the Institute of Food Distribution—which was set up on 1st August, 1968, and which is in process of establishing a Research Department associated with the Manchester Business School—will be to make contact with existing research workers and to see what gaps need to be filled.

FOOD RESEARCH INSTITUTE

Open Days

The Food Research Institute of the Agricultural Research Council will hold the first Open Days at the Institute from April 23rd to 26th, 1969. April 24th and 25th have been reserved for scientists, industrialists, etc.

Application for a ticket of admission and programme of demonstrations should be made to the Open Day Secretary, Food Research Institute, Colney Lane, Norwich, NOR 70F.

National Grassland Demonstration

This year the Shellstar sponsored National Grassland Demonstration will take place on May 20th and 21st at the National Agricultural Centre, Kenilworth, Warwickshire.

As in the past there will be a wide variety of demonstrations, including: Silage making, Machinery displays, Irrigation, Fertilizer handling and Grassland Variety Trials. There will, of course, be many others.

The N.A.C. will also be open to visitors.

Car park and entry to the demonstration are both free.

The author, **E. N. Thorpe,** *of the Agricultural Land Service,*
discusses recent developments in inexpensive buildings
and materials for agricultural use

Plastic Structures

THE high capital cost of new building and the rapid obsolescence of highly specialized structures resulting from changing production techniques and management policies is causing the farming and horticultural industries to search outside the field of traditional constructional methods and materials for alternative simple, inexpensive buildings and materials which can be erected or dismantled easily with its own labour and which, because of low cost and short life, can be written off financially and physically in a short term of years.

Plastic covered structures may well provide at least part of the answer to this problem, for today farmers are more concerned whether the new building will provide a worthwhile return on the capital outlay than how long it will last. The reason for this is, of course, due to the fact that capital is short, interest rates high and money spent on buildings is not available for other purposes.

Basically there are two main types of structure which use plastic sheets to keep out the weather. One uses simple framework to support the sheeting. The other is a bubble type which relies on air inflation from within for support.

Plastic covered framed structures

The primary function of the framed type is to provide shelter for livestock and horticultural crops from wind, snow and rain. The basic aim is cheapness and simplicity in construction, so the provision of permanent floors, expensive fittings and fixtures would defeat this. It is important to bear in mind, however, that economies in design strength for materials and supports, foundations, etc., can increase the dangers of damage or collapse of this type of structure under adverse weather conditions. Careful siting and anchorage is thus important, so cross wind siting may prove less of a risk than 'gable end on' to the prevailing wind.

In its simplest form this type of structure consists of a series of semi-circular arches, spaced up to 10 ft centres, carrying light timber purlins over which plastic sheeting is secured. In good condition, second-hand framework from Nissen, or its big brother Romney, type hut is well suited for this purpose. It should be emphasized, however, that the use of second-hand materials, unless carefully selected, can increase the dangers of collapse in adverse weather conditions. As an alternative, arches can be made up from

2 in. tubular steel scaffold poles if the span is no more than about 24 feet. For wider spans small section rolled steel channels or simple lattice arches are required, in which case it is advisable to entrust the fabrication to a steelwork engineer.

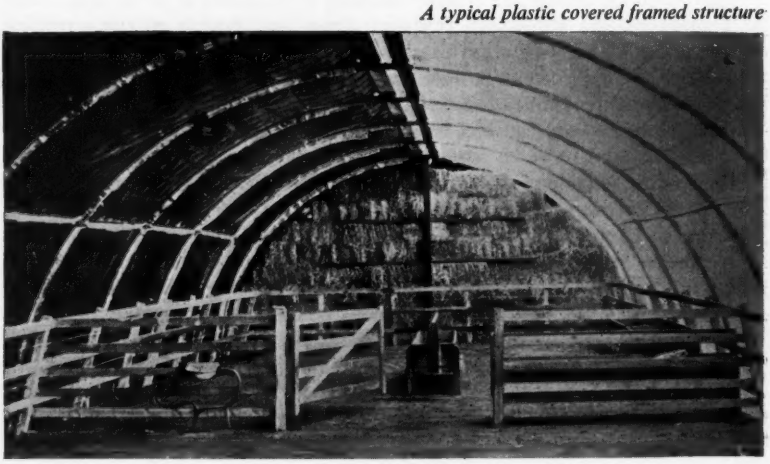
For this type of structure 1000 G sheeting would, for most purposes, prove satisfactory. On the south side of a stock building this can be black film but on the north side translucent sheeting is preferable. If the structure is to be used for horticultural purposes where light transmission is of prime importance, then a clear sheeting is essential. Care in fixing is important. The material may creep or stretch after erection and need replacement long before the supporting structure. Rapid localized wearing may be caused by rubbing against the supports, while certain material, when in contact with some varieties of plastic sheeting, can increase the rate at which it will break down under the action of heat and ultra-violet light. Provision should, therefore, be made in the design for re-adjustment of tension and to cushion the covering by wrapping or lagging the framework with material similar to that used for the cover. Fixing and jointing must also be carried out with care, usually by plastic welding or the use of proprietary adhesive polythene tape.

If the site chosen for the structure is on a free-draining soil, flooring of the building for livestock or storage should not be necessary. In less favourable conditions, well consolidated hardcore may be essential. A concrete floor can seldom be justified. Where bedding for stock is expensive or in short supply a raised slatted floor, readily dismantled for mucking out, may be an alternative worth considering.

Drainage is an important consideration, particularly where stock is to be housed. It is essential to prevent flooding of the floor and waterlogging of the sub-soil which could seriously affect the stability of the building.

The need for environmental control for livestock must not be overlooked. A continuous 6 in. gap at ground level along both sides of the building will provide inlet ventilation while a continuous 6 in. gap along the top of the roof will allow outlet ventilation. This will reduce the problem of humidity, particularly if care is taken to ensure a dry, well-drained floor

A typical plastic covered framed structure



and bedding. Simple baffles can be used to prevent cross draughts and to counteract any difficulty from driving snow or rain. These measures, combined with the use of black or other opaque covering on the south side, will help to control the temperature. Should local heat or insulation be needed this could best be provided by the use of portable heaters and straw bale kennels. If stock is to be housed, clearly some simple form of internal barrier must be provided to prevent the plastic sheeting being damaged. Cheap timber stall divisions for cattle, straw bales for calves and a woven wire-netting fence for sheep could well suffice.

Bubble type structures

This type of structure is more suitable for providing storage accommodation than for housing livestock. It can be cheaply and quickly erected by farm labour. No permanent site is needed and probably after no more than two seasons the structure would be removed and re-erected on a new prepared site. The plastic sheeting may, however, need renewing to ensure adequate light transmission.

This type of structure, as its name implies, is an air supported house. This is formed by trapping air under pressure beneath a sheet of plastic film. According to the use for which the structure is intended this can be 500 or 1,000 G, clear, ultra-violet inhibited or black film. Construction consists mainly of burying the edges of the sheet in a trench around the periphery of the area to be covered.

The largest single sheet at present available is approximately 100 by 36 ft —which requires a rectangular foundation trench approximately 85 by 23 feet. To provide adequate anchorage and air sealing, the trench should be at least 18 in. wide by 18 in. deep. To prevent waterlogging and loss of anchorage in the back filled soil, it is wise to spike drainage holes through the plastic material on the bottom of the trench with a garden fork or other suitable implement before re-filling. Ducts need to be provided for the fan or fans supplying and maintaining air pressure at one end of the house. At the opposite end a variable pressure relief flap will provide control over internal air pressures. Access at this end is by way of an entrance tunnel with air lock doors.

The points at which the plastic sheeting is trimmed around rigid ducts or framework are subject to frequent stress and flexing as the envelope moves under an external wind pressure. To minimize the danger of tearing, and where soil conditions are suitable, the use of underground fan and vent ducts is to be recommended. It is not practicable to bury the entrance tunnel completely but it, too, should be sunk into the ground as far as possible.

The plastic envelope is entirely dependent upon the maintenance of internal air pressures for its support. The fan/ventilation installation should be designed to maintain an internal air pressure of 0·3 in. water gauge with provision to increase this to 0·5 in. water gauge to counteract the greater external pressures produced by storm conditions. In houses used for growing crops or for other purposes requiring controllable environmental conditions of temperature and humidity, provision should be made for adequate fan capacity to ensure up to 30 air changes per hour. Since loss of pressure will result in rapid collapse of the envelope it is recommended that regular inspection be carried out for tears and punctures. These should be repaired before serious leaks can develop. A standby generator will guard against

power failures and, as a safety precaution, workers entering the envelope should be equipped with a knife so that an exit can be cut in the film if sudden collapse occurs.

Vulnerability to mechanical damage, the absence of framework and dangers attendant upon premature failure or collapse of the envelope, coupled with restrictions on access and rapid fluctuation in climatic conditions, are factors which, in practice, have limited the use of this type of building principally to the growing of suitable horticultural crops.

Costs

It is often difficult to give realistic costs of farm buildings as so much depends on a variety of factors, including location and specification. However, as a guide, a proprietary type of steel-framed structure clad with nylon reinforced P.V.C., 80 by 27 ft, can be purchased and erected for about 7*s.* 6*d.* per sq. ft of floor area. Adapting the Nissen type hut with maximum span of 18 ft should work out at about 8*s.* per sq. ft while the Romney hut with a span of 36 ft might cost an average of 10*s.* per sq. foot.

For the bubble type structure, 115 by 60 ft, including a 6,000 c.f.m. fan, entrance way and anchoring equipment, it would be necessary to allow 9*s.* per sq. ft of floor area. The fan would maintain the requisite air pressure already mentioned at a running cost of about 2*d.* per unit of electricity per hour, or, say, roughly 28*s.* per week.

Because of the cost, few new farm buildings are provided which incorporate traditional construction with load bearing walls. Pre-fabricated structures based on the Dutch barn principle are invariably used with infilling for walls as required. This type of structure would cost about 10*s.* per sq. ft to which would have to be added the cost of walling, which can vary enormously depending upon the materials used and type of construction.

Plastic structures where they provide a suitable alternative for the purpose required are thus likely to compare favourably in intial cost. In spite of this there is still a preference for traditional construction or framed buildings on the farm. This can possibly be attributed to the fact that whilst initial costs of permanent buildings are relatively high, it can be demonstrated that a long-term 'write off' period and low annual maintenance requirements will reduce annual costs in many instances below the annual costs of a cheap, temporary shed, whatever the cladding. Nevertheless, production techniques, marketing requirements and labour availability are constantly changing so that specialized buildings can become redundant over quite a short span of years. These uncertainties and low initial costs can make the plastic covered structure popular, particularly as improved designs and materials become available.

Current developments

Recent developments of the plastic covered structure include the marketing of the complete structure with inflatable supporting arches, frames which fold or can be reduced to small components for easy transportation and assembly in remote areas, the use of laminated timber components and a novel design consisting of two strong and rigid end frames between which high-tensile line wires 9–12 in. apart are strained. This has obviated the need for most of the intermediate framing, while the close spacing of the support

wires enables the sheeting itself to be closely fitted and retained in position without sagging or the need for supporting and retaining nets necessary in earlier designs. The tautness of the sheeting thus obtained reduces flapping, the usual cause of damage and chafing and a possible stress factor where the more timid type of animal is to be housed.

Another innovation is for the sheeting to be provided in widths of about 6 ft which are laid across the span of the building. While allowing a small overlap to keep out the weather, such a system permits good ventilation to be provided at each overlap, while the spring tensioning of the sheets at ground level is simplified and the replacement of any damaged sheeting can be quickly carried out.

Improvements are also being made in plastic covering materials. Thicker gauge sheeting and the use of ultra-violet light inhibitors in the chemical formulation are helping to extend the life of the materials beyond the two years which appears to be about the present limit—though in the case of horticultural crop houses, annual replacement may still be necessary to ensure adequate light transmission. Glass reinforced polyester and translucent polyvynyl-chloride sheeting is readily available in rigid corrugated sheet form while reinforced plastic sheeting and butyl rubber sheeting are being increasingly favoured, as a flexible covering material, particularly where light transmission is not a management requirement.

Conclusion

There is no doubt that for specific management requirements the simple low cost structure covered with inexpensive plastic sheeting or 'bubble' houses have definite advantages. Initially, perhaps, they were looked upon with scepticism as something of a gimmick, but perseverance and ingenuity by a handful of enthusiasts has thawed the ice, with the result that they are becoming seriously considered for use on the farm for a variety of purposes.

Clearly they do not commend themselves to landowners seeking to secure from improvement works a long-term or permanent increase in the annual and capital values of their property. Equally, the high annual charge needed for quick recoupment of capital would be unacceptable to many tenants. On the other hand, owner-occupiers or tenants seeking additional buildings or cover with low initial capital outlay may well be attracted by the advantages which a well-designed, easily erected and fairly inexpensive plastic covered structure can offer.

A final word of warning must be added. Care should be taken to safeguard amenity in the countryside. Indiscriminate siting of inferior-looking structures of poor design can be a real eyesore which can so readily be avoided if a little thought is given to siting and design in the initial stages.

Further reading

Technical Report No. 16. *Plastic Structures* may be obtainable free from Ministry of Agriculture, Fisheries and Food (Publications), Tolcarne Drive, Pinner, Middlesex.

An article on plastic buildings for the horticultural industry will appear in a future issue of 'Agriculture'

Welshpool Market

Fat Lamb Marketing in Montgomeryshire

H. E. G. Morgan

THE June, 1968, return shows that the number of breeding ewes in Montgomeryshire increased again during the past year and now stands at 448,000 which is double the figure for 1950 and 20 per cent more than for 1961. As there has been a considerable reduction in sheep numbers in the lowland areas of the county during this period, it is clear that this increase has taken place on the upland farms.

Effect of hill sheep subsidy

The number of ewes on which the full rate of subsidy is drawn has increased by 36 per cent in the past seven years and hill flocks now form 49 per cent of the county sheep population. Before the 1967 Annual Review, the half (or basic) rate of subsidy was paid on ewes of specified breeds in flocks which were kept on land suitable only for maintaining hardy sheep and conformed to certain management requirements. The basic rate is now paid on all ewes, irrespective of breed, which are kept on land eligible for hill cow subsidy. As a result, this type of flock accounts for one-third of the county total. The latest figures show that 82 per cent of the breeding ewes in the county receive either the basic or full rate of hill sheep subsidy.

The decline in the draft ewe and store lamb trade in recent years has forced upland farmers to sell an increasing proportion of their lambs as fat lambs. With this concentration of the sheep population in the upland areas of the county, where the lambing date is fixed by environment, there is a likelihood that the date of maturity of a large proportion of the lamb crop would be similar, thus causing glut marketing conditions in the autumn period. Alternatively, this intensification that has taken place so rapidly in the pass seven years could result in an increasing number of lambs being marketed at hoggets.

Throughput of markets

Examination of the marketing data over recent years shows that although there is an increase in the number of fat lambs being produced, only two of the eight fatstock markets in the county have significantly increased their throughput, namely Welshpool and Llanidloes. One centre serving a lowland area has been closed and replaced by a market handling a similar number nearer the upland area at Newtown. The new centre was opened during the foot-and-mouth disease restrictions and it remains to be seen if the business which was done during that period can be maintained. The two centres which are increasing their throughput are the fortnightly Friday market at Llanidloes and the weekly Monday market at Welshpool. The latter is the only fatstock market in the county which is open at weekly intervals throughout the year. In the twelve-month period ending 31st March, 1967, 105,968 fat lambs were certified at this market, representing about 60 per cent of the total certified at fatstock centres in the county. Although Welshpool market was closed for sixteen weeks because of the foot-and-mouth disease restrictions, the total fat lambs certified during the twelve-month period ending 31st March, 1968, was 79,279 or 47 per cent of the county market total.

The fact that two centres have increased their numbers means that they meet the farmers' basic requirements of a fatstock market. These requirements are that market facilities should be such that live weights can be determined quickly, that grading should be accurate, and that the auction should attract the maximum number of buyers who are willing to buy on a competitive basis, resulting in an average market price which is above the national average. Only on two occasions in the past three years has the Welshpool market average been less than the national average. This fact is becoming so well known that lambs come from as far away as Anglesey and Carmarthen at certain times of the year. Consequently, the weekly numbers of fat lambs presented at Welshpool do not truly reflect the story of intensification of sheep on the upland areas of the county in recent years. Weekly market numbers at Welshpool usually reach two thousand by the end of June, three thousand by the end of August, and then maintain this figure until Christmas with a peak at the end of October. The last market before the previously mentioned closure was an all-time record at 4,535 lambs.

The number of hoggets presented at Welshpool has shown a tendency to decrease in the last four years, but all other centres have remained reasonably constant.

The only centre which is essentially a 'local' market showing any significant increase is Llanidloes, having doubled its annual throughput in recent years to reach a record 13,000 lambs for the twelve months ending 31st March, 1966, with a further increase of 2,000 lambs in the following twelve months,

despite the foot-and-mouth disease restrictions on stock movement. Maximum numbers at this market have always been at the end of November; a period of improving price and increased numbers have merely heightened and broadened this maximum period.

Llanfyllin is the second largest fat lamb market in the county and has remained fairly constant at about 20,000 lambs per year. This is a local market serving mainly a mountain area and although four years ago the largest market for fat lambs was early September, the peak is now reached in early November. Caersws, with about 14,000 lambs marketed per year, has had its largest market at the end of November for the past two years, compared with the end of October four years ago. This market was just outside the infected area during the foot-and-mouth epidemic and, as a result, the lambs marketed increased by 9,000 at this centre last year. Present indications are that numbers are back to normal again this year.

Cemmaes Road fatstock market handles about 12,000 fat lambs in the six-month period from June to Christmas that it is open. The peak period, formerly early September, has now moved to early October. Llanfair Caereinion, a much smaller centre handling about 5,000 lambs in the six-month period from June to Christmas, now has its peak period at the end of October compared with the end of September up to four years ago.

The only centre which has suffered a reduction in the number of lambs sold is Machynlleth; 8,083 fat lambs were sold at this centre in the twelve-month period ending 31st March, 1965, but in the following twelve-month period this reduced to 4,052. This was mainly due to the opening of a deadweight centre at Machynlleth on 17th May, 1965, which now handles about 4,500 lambs per year. There are only four deadweight centres in the county but they are handling an increasing number of fat lambs. In the twelve-month period ending 31st March, 1968, which was inflated by foot-and-mouth disease restrictions on markets, 23,100 lambs were slaughtered at local deadweight centres.

Sales on a deadweight basis

It is not possible to obtain an accurate picture of the number of fat lambs sold on a deadweight basis for processing outside the county because they often travel long distances. The main centres are Birmingham, Manchester and Liverpool, which are about 50 miles or more away, though some go as far as London and the Home Counties. Before the foot-and-mouth epidemic, some ten different agencies were buying about 220,000 lambs in the county each year for payment on a deadweight basis, while the fatstock auctions handled 180,000. The number of agencies buying on a deadweight basis increased during the foot-and-mouth disease restrictions, and the proportions sold on this basis rose last year to over two-thirds of the county lamb crop. Present indications are that these buyers are retaining their grip on the market because most market figures show a decreased turnover on last year. For example, at Welshpool in the first quarter for twelve months which had not been affected by foot-and-mouth disease, 31,882 lambs were certified for fatstock during weeks fourteen to twenty-six compared with 39,609 in the same period last year.

Most of the deadweight agencies feel that about 60 per cent of the farmers who sell to them are now converted to this system of marketing. A further 20 per cent sell their earlier lambs at the auction markets and their later

lambs on a deadweight basis. The remainder watch the market for small variations in price but usually sell a larger proportion of their lambs at markets using the deadweight method when markets are depressed.

Sales through fatstock auctions

The total number of breeding ewes has increased by 20 per cent in the past seven years but the number of fat lambs marketed through the fatstock auctions has only increased significantly at two centres. This is due to the increasing popularity of selling lambs on a deadweight basis. The failure of most centres to increase their throughput, highlights the difficulties of local authorities providing capital for the improvements required and for auctioneers who, in many cases, work with short-term leases. Large numbers of competitive buyers can only be attracted to the larger markets and there seems little doubt that the good markets are the only ones that will increase in size.

Conclusion

There are signs that the intensification of sheep numbers that is taking place in the upland areas is leading to a longer fattening period with maximum market numbers appearing later in the year. If this trend continues the glut period could become so late as to coincide with the arrival of New Zealand lamb.

THE AUTHOR

This article has been contributed by **H. E. Gwynne Morgan, B.Sc.(Agric.) (Hons.), (Wales), D.T.A.(Trin.),** who is District Agricultural Adviser with the National Agricultural Advisory Service at Newtown, Montgomeryshire.

ROYAL SOCIETY OF ARTS

John Adam Street, Adelphi, London, W.C.2

Wednesday, 12th March, 1969, at 6 p.m.

Agricultural Co-operation

by J. G. Jenkins

Deputy Chairman, Central Council for Agricultural and Horticultural Co-operation

SIR BASIL ENGHOLM, K.C.B.

Permanent Secretary, Ministry of Agriculture, Fisheries and Food

will preside

M. P. S. Haywood discusses egg production for the tourist industry in Caernarvonshire

Eggs in Caernarvonshire

THERE can be no future for an industry that produces a commodity for which there is no demand or produces a greater quantity of the commodity than is actually required. In the egg production field it is, therefore, increasingly important to tailor the production to the demand or potential market for eggs. Caernarvonshire has a large number of tourists staying in the county during the summer and this obviously increases the potential market for eggs in this area.

Size of potential market

Out of approximately four million tourists coming into Wales, almost one million stay in Caernarvonshire. The holiday season lasts about fourteen weeks from the beginning of June to the middle of September and the average length of stay for each tourist is ten days. This means, therefore, that at any one time ninety thousand tourists will be in the county. With the resident population at 120,000, the average total population (tourists and residents) for the county over the summer period is 201,000. As each person, on average, will consume five eggs a week, there is a potential market for three thousand cases of eggs per week. At the moment the county's laying flock stands at 133,000 birds which will produce on average 1,850 cases per week. This output is satisfactory for the normal resident population.

Summer egg production

The means of coping with this period of fourteen weeks increased demand is not to keep hens in the normal way, because these extra eggs are only needed during the holiday period and an increase in all-the-year-round production would lead to severe over-production during the winter, with difficulty in disposing of the surplus. One way of providing this extra production for the summer period is to use birds which have already completed one laying season. If hens are purchased from the larger battery units in the county after completing twelve to fourteen months laying in March or April, then force-moulted and brought back into lay, they will lay for the summer period, reaching a peak of about 75 per cent production with over 80 per cent large eggs. These hens can be purchased for about 3*s.* 6*d.* each and will cost a further 1*s.* 7*d.* to feed until they start producing eggs, but at the end of

the summer there would be a carcass value of about 2*s.* 8*d.* per bird which brings the depreciation cost for the short laying season to 2*s.* 10*d.* per bird, allowing for 7 per cent mortality over the forced moulting period and 4 per cent over the laying period.

Forced moulting programme

Moulting period (three weeks—period until egg production ceases and feathers drop)

1. Cut artificial light and dim light as much as possible—in a windowed house exclude outside light by putting sacks, etc., over windows, thus avoiding outbreaks of cannibalism.
2. Remove water for 24 hours, then give water for two hours per day.
3. Remove all food for first two days.
4. Then feed 7 lb grain/day/100 birds in three equal feeds each day for five days.
5. Increase to 9 lb/day/100 birds through the rest of the three-week moulting period.
6. Mix ½ pint cod liver oil to every 1 cwt grain.
7. Give limestone and flint grit.

With successful forced moulting, feathers start dropping within 10-15 days and production should not exceed 5 per cent.

Recuperating period (3rd–8th10th week)

1. Feed 3 lb wheat bran or 2 lb ordinary layers mash per day per 100 birds.
2. Give 9 lb grain per day per 100 birds in three equal feeds.
3. Mix ½ pint cod liver oil per 1 cwt grain.
4. Give water *ad lib.*
5. Give limestone and flint grit.

This period can be continued for any length of time but not less than five weeks after moulting period.

To bring into lay give artificial light to ensure that the birds have a 17-hour day, layers food *ad lib* and manage as a laying flock.

Housing system

Any housing system from batteries to free range can be used for this method of keeping poultry. If batteries are to be used, some difficulty might be experienced if they are scraper cleaned, as during the forced moulting period the feathers tend to foul-up the scrapers, and in this case it would possibly be advisable to force moult birds on litter first before putting them into the batteries. There are, of course, no problems with belt cleaned or paper cleaned batteries. On deep litter the birds should be allowed 3 sq. ft each and if they are going on to free range they must be confined to a house during the forced moulting period, again allowing 3 sq. ft per bird.

There is no need for elaborate accommodation and this could be a means of making use of buildings which are only used during the winter, such as barns, cattle yards and potato storage sheds.

Egg marketing

The marketing of these eggs will, of course, be by direct sales or semi-direct sales delivering the eggs to hotels, guest houses and caravan sites or selling the eggs to shopkeepers. The average price of eggs sold to shopkeepers last summer was in the region of 3*s.* 9*d.* a dozen, whereas the price received for eggs sold direct to guest houses, caravan sites, etc., varied from 4*s.* to 5*s.* per dozen. This means that the average price received by the farmer for eggs sold for consumption by tourists varied from about 4*s.* to 4*s.* 6*d.* per dozen.

Budget for 17-week laying season

Second week in May—second week in September

Returns:		*per bird* s. d.	*per 100 hens* £ s. d.
81 eggs per bird (6¾ doz. sold privately) at 4*s.*		27 0	135 0 0
Carcass value		2 8	13 6 8
Output	=	29 8	148 6 8
Variable Costs:			
Cost of old battery hen		3 6	17 10 0
Feed through moult		1 7	7 18 4
Feed for 17 weeks—4·6 oz per bird at £40 per ton		12 3	61 5 0
Mortality		5½	2 5 10
Total variable costs	=	17 9½	88 19 2
Gross margin	=	11 10½	59 7 6

If 4*s.* 6*d.* per dozen was charged then the gross margin would be increased by 3*s.* 4*d.* to 15*s.* 2½*d.* per bird or £76 1*s.* 3*d.* per 100 birds.

Size of unit

In the main the size of the unit taking advantage of this system of poultry keeping is small, from four to six hundred birds on the general farm, making use of buildings which would normally remain empty over the summer period and using equipment which was discarded three or four years ago due to low margins from traditionally kept poultry. There are one or two units in the thousand to fifteen hundred bird size changing over to this system now that it is increasingly difficult to get rid of eggs in this area during the winter period, even to packing stations, which are very few and far between and which, quite rightly, are reluctant to take eggs from producers only in the winter.

This system of poultry keeping will equally suit any other area which has a high tourist population in the summer, and could be operated in many of the English and Welsh counties which attract visitors.

Budget for 34-week laying season

May to December

Returns:		*per bird* s. d.
156 eggs (65 per cent production) sent to packing station at average price 2*s.* 8*d.* per dozen		34 8
Carcass value		2 8
Total returns	=	37 4
Variable costs:		
Cost of old battery hen		3 6
Feed through moult		1 7
Feed for 34 weeks' lay—4·6 oz per bird per day at £40 per ton		25 0
Mortality		8
Total variable costs	=	30 9
Gross Margin	=	6 7

Twelve-month cycle

There is, likewise, no reason why this system should not be run on a twelve-month cycle, purchasing the birds each spring, force moulting them and bringing them into lay in May, and clearing them out at the end of December, with the eggs going to the packing station. The return per bird is not so spectacular, of course, as the average price received for the eggs will be much lower, though the slightly reduced production will be counteracted by the better grading from birds in their second year.

This article has been contributed by **M. P. S. Haywood, N.D.P.**, County Poultry Husbandry Adviser for the National Agricultural Advisory Service in Anglesey and Caernarvonshire.

Co-operation in Road Making

D. A. B. Parsons

'Five miles of roads completed in Crowland Wash, grant paid £3,540' is a quite simple statement but let us look behind the scenes and see the need for these roads and the frustration experienced in obtaining them.

There are many instances in the Holland area of Lincolnshire where the river runs at a higher level than the surrounding land. As a safety valve in time of heavy rains substantial areas of land adjoining the river have been enclosed with earth flood banks; these areas are known as Washes. Obviously, as long as these areas are likely to be consistently flooded they can only be used as pasture. Just south of Spalding lie the Cowbit and Crowland Washes which, due to works on the new river carried out between 1958 and 1961, are no longer likely to be flooded; consequently these are now in arable cropping.

As long as the Crowland Washes were in grass the drift roads, or droves, in their natural state sufficed for the access of stock and haymaking machinery, but with the turn-over to arable and the need to haul off root crops or corn, earth droves soon became quagmires. In June, 1961, the Holland Agricultural Executive Committee drew attention to the problems and advantages of improving the droves. A meeting resulted at which representatives of the Ministry of Agriculture, Fisheries and Food, the Internal Drainage Board, the County Council and the N.F.U. were present. One problem was elucidating the ownership and responsibility for maintaining and improving the

droves, but little was resolved although it was determined that under an Award of 1823 the Commissioners directed that owners and occupiers of land should appoint a 'surveyor' whose responsibility it should be to ensure that the droves were maintained. The fund for this purpose was to be raised by a rate on the appropriate owners and occupiers, and the surveyor also had the power to sell the grass keep on the droves and use the money for repairs. At the conclusion of this meeting it was left to the N.F.U. to approach the farmers interested in hardening the droves to decide whether a joint scheme could be drawn up.

In November, 1961, the local branches of the N.F.U. arranged a meeting to discuss the possibility of providing hard roads in the Crowland High Wash by co-operation between all the owners and occupiers. Less than 30 per cent of those invited turned up. A further meeting, called on 26th March, 1962, of all owners and occupiers of the land in the High and Low Washes was attended by some fifty persons when a working party was set up to go into details of making some five miles of hard road. In spite of the work and effort put in by this Committee the ownership of the droves could not be established and no scheme had been evolved by early 1965, at which time the state of the droves was such that it was almost impossible to negotiate them, even with a crawler tractor.

During 1965, on the instructions of the Agricultural Executive Committee, all the problems of getting a road constructed were referred to the Agricultural Land Service in consultation with the Deputy A.E.C. Chairman who was also a member of the working party.

The Agricultural Land Service gave advice about the following matters:

1. A joint application by owners and occupiers for grant under the Farm Improvement Scheme.
2. The National Farmers Union acting as agents.
3. Payment of grant direct to a contractor as a simple means of avoiding complications and disputes which might otherwise arise in the division of grant amongst many applicants occupying devious areas.
4. Design, materials and construction of the road.
5. Its future maintenance.

At a meeting held on 27th September, 1966, tenders were available for hardening five miles of drove which would benefit some 750 acres in the occupation of over fifty farmers. It was agreed that a letter should be sent to all occupiers and owners explaining that a standard charge of £9 per acre was intended and they were asked to sign an agreement to this charge. They were also asked to agree to the appointment of the N.F.U. as agents. It was also decided to submit an application to the Ministry for a Farm Improvement Scheme Grant and the Investment Incentive, and the occupiers were requested to agree that any grants received should be paid direct to the contractors who undertook to do the work.

Early in February, 1967, the joint application for grant was submitted. Although at that time only approximately thirty of the occupiers had signed the agreement, the land in their occupation which would benefit amounted to 550 acres. After the usual investigation which involved a visit by the Agricultural Land Service to all the owner-occupiers and tenants, the proposal was approved for Farm Improvement Scheme Grant on 27th April, 1967.

Work commenced early in July on the road in the High Wash. It was decided to start on this section first because the majority of the participants

along this length of road had agreed to a revised rate of contribution of £12 per acre, an increase which proved to be necessary due to the contractor who submitted the lowest tender being unable to undertake the work. As the work proceeded and the improvement became apparent the revised rate of £12 per acre was soon agreed by the majority of the remaining participants.

It had been decided, mainly for drainage reasons, not to put the hard road down the centre of the 30–40 ft wide droves but to keep it to one side. The method used to construct the road was to level the 10 ft width of roadway with a bulldozer, tip reject bricks from the nearby Peterborough brickworks, level and crush them with the bulldozer and consolidate them to a thickness of not less than 12 inches with a heavy roller. The surface was then blinded with hoggin, the whole rolled a number of times.

The whole scheme amounting to some five miles of road, including adequate passing places and 120 hardened access ways to fields, was completed by the end of October, 1967, at a cost of £11,800 on which £3,540 in grants was paid. The eventual number of participants in the scheme rose to fifty and their contributions covered the net cost of the scheme.

The road has now been in use for twelve months and in my experience few improvements could have been more worth-while. The very bad weather conditions during the 1967 beet and potato harvest and during the 1968 corn harvest would, undoubtedly, have made the old earth drove impassable. Not only have crops been saved but the value of the land has been doubled—land with good access in this neighbourhood is changing hands at £400 per acre. Perseverance and co-operation can usually surmount the most intractable problem.

Important note

Not all co-operative ventures of this nature are eligible for grant, therefore, in the first instance, it is advisable to consult your local Divisional Office of the Ministry to ascertain the conditions under which such grants are applicable.

This article has been contributed by **D. A. B. Parsons, F.L.A.S.,** who is a Senior Assistant Land Commissioner with the Agricultural Land Service for Huntingdon, Bedfordshire and Lincs. (Holland).

Farm Accidents in 1968

There were 114 people killed on farms in England and Wales during 1968. The total for 1967 was the same.

The main cause of death continued to be the overturning tractor, with 32 fatalities in 1968 as compared with 33 in 1967 and 39 in 1966.

The figures include 16 children under 15 years of age, compared with the figures of 23 in 1967, 17 in 1966, 16 in 1965, 18 in 1964 and 16 in each of the years 1963 and 1962.

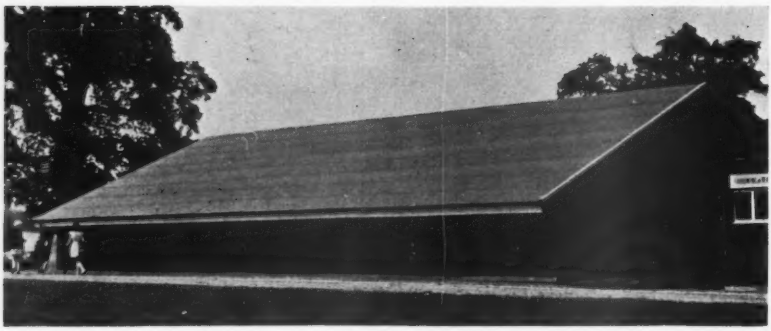
Modern Farm Buildings

Beef fattening yards at [illegible], Berkshire

This feature, an appraisal [illegible] of farm buildings, contains articles by:

John B. Wellington, [illegible], Dip. Arch., who is a Chartered Architect in private practice at Ipswich, Suffolk.

[illegible] D.J. Yeates, [illegible] Lond., A.R.I.C.S., who is a Senior Assistant Land Commissioner with the Agricultural Land Service. In October 1967 he was appointed Liaison Officer at the Farm Buildings Centre, Kenilworth, Warwickshire.



Poultry building in demonstration area of Royal Showground: example of stressed timber construction using plywood panels (external grade)

Appearance of Farm Buildings

John B. Weller

TEN years ago—even five years ago—the subject of the appearance of modern agriculture was rarely considered. Farmers did not discuss the appearance of their landscape, buildings, services or equipment. Farming was a hard business: only hobby-farmers worried about appearance. Yet, today, appearance has become an accepted topic.

Anyone who doubts whether there has been a real change of outlook should study the farming press for 1963/64 and compare it with that of 1968/69. The contrast is marked. It is worth noting the stages of this change, but in the first place it is necessary to consider the legal position.

The basis of national thinking towards planning and amenity is to be found within the 1947 Town and Country Planning Act. The Acts of the early 1930s were mainly concerned with health and safety in their planning. The breakthrough came with the Scott Report of 1941—especially as far as rural areas were concerned—which led to the 1947 Act. Planning permission became necessary for all buildings and engineering works or for material changes in land use and in existing buildings, as well as for alterations to access on to trunk or classified roads. Implicitly, permission had to include consideration both of land use/location and of amenity/appearance.

The basic fault of the 1947 Act (in spite of its major contribution in controlling and modelling the rebuilding of post-war Britain) lay in its failure to distinguish between planning for function and planning for amenity. These two aspects of planning need different criteria. In fact, the term 'amenity' appears only four times within the Act and nowhere is it defined. Amenity can mean 'h and c' in all bedrooms, a shopping centre, a 'Constable' view of

Everclad buildings **1**

Everclad plastic coated steel sheet scores on cost as well as colour

This fine barn and cattle building, 180 ft. x 126 ft. was built for Mr. J. D. Alston, Heath Farm, North Lopham, Norfolk, to a design undertaken by a well-known firm of chartered surveyors, in co-operation with Messrs. Patrick's Joinery Works, Walton Highway, Wisbech, Cambs., who supplied and erected.

Evergreen PVC-coated galvanized steel sheet (now marketed as Everclad) was chosen for all the roofs of the timber-framed building. Not simply because it gave attractive permanent colour; it chose itself on very real savings in material and fixing costs when compared with alternative materials; plus long-term savings because of its freedom from maintenance.

For full details about those savings, and about Everclad, the roofing and cladding material that meets the new requirements of the Countryside Act just post the coupon.

Building now?

To Colorcoat & Cladding, Bryngwyn Works, Gorseinon, Glamorgan. SA4 2DD.
Please send me details of the new Everclad steel sheet for roofing and side cladding.

Name

Address

A3

British Steel Corporation, South Wales Group.

unspoilt, pastoral countryside or a mediaeval street of timbered houses. It is a thing both of historical or visual attachment or of modern social utility.

Farmers did not bow their heads to the planners. Their outcry was so great that the need for planning permission for farm buildings was abolished in 1950—except for the few cases when they might impinge on the safety of road or air travellers. Planning permission was retained, however, for certain areas designated as having special beauty, such as the Cotswolds.

The world of 1950 is more than a generation apart from that of 1970. The technical revolution within that time astounds the mind. This is true in farming as in all spheres of life. We have entered a space age of computers, automation, nuclear power and chemical control over life. The scale and pattern of living has changed. It is for these reasons that the problem of the appearance of farm buildings has destroyed the tolerant atmosphere of 1950, when society exempted almost all farmers from planning control.

Farmers failed to cope with technical change in a manner that satisfied an urban Britain. The rash of asbestos shackery, often encrusted with ugly additions to accommodate the services to the storage and livestock buildings, got larger every year, and caused growing pressure against the farming community. By and large, farmers did not try to produce buildings which were technically sound both in function and in construction, and with components that were co-ordinated. It was mainly this lack of co-ordination that not only produced the visual slum, but often reflected an inefficient flow-line production for food. It also reflected the Government's changeable relationship with farmers and importers of food into Britain.

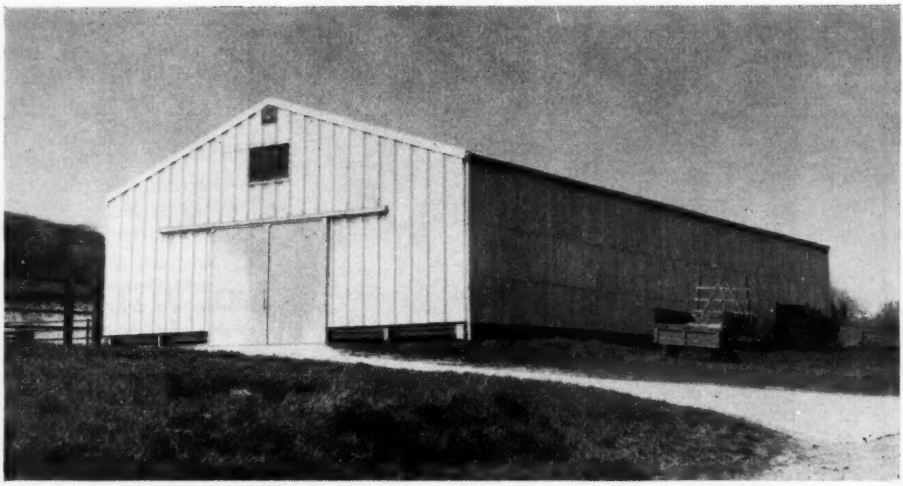
In 1960, farm buildings of 5,000 sq. ft came under planning control, which meant that planners were supposed to pass aesthetic judgment about proposals (usually badly drawn and presented) concerning a rapidly changing industry, where the profit margin not only was often low but also fluctuated with the country's feverish economic pulse.

Moreover, many planning committees were against all change unless it was 'twee' and thatched. Modern house designs were hit by confused aesthetic judgments as much as those for a new piggery or cattle shed. At the same time, power stations, pylons, military paraphernalia, etc., were exempt. It was, and still is, a frustrating situation.

In 1960, probably the only body really concerned about the marriage between modern technology and the visual presentation of artefacts (whether a spoon or a farm building) was the Council of Industrial Design which had, and has, an advisory panel for the design of farm buildings. Most manufacturers and nearly all farmers still fear that concern for the way things look, if not effete, is a serious risk to the profit margin. The real technocrat realizes that bad presentation usually reflects an inefficient mind—the latter being the real risk to a profit margin.

The problem of appearance is confused by careless thinking. Weedy water meadows, enclosed by rambling hedges and grazed by Buttercup, Daisy, and Mary, are attractive, but a medley of sentiment. The 200-acre prairie of ripening corn is also beautiful but a token of efficiency. One cannot deliberately contrive the former. If you try to, you are doomed to failure both visually and economically. You can produce the latter if you co-ordinate your energy and resources, but one wild oat and the beauty is lost. So it is with buildings.

It is true that Nash, 150 years ago, produced sentimental design successfully in the cottage orne style. But when the cost ratios are kept to the norm,



This photograph shows a typical K&B grainstore, 50 ft. span x 100 ft. long and 16 ft. to eaves. Larger buildings are no problem.

Here's another K&B success!

from our range of modern steel-framed

STANDARD AGRICULTURAL BUILDINGS

Such excellent value-for-money stems from our system of standards in design and manufacture, this leads to efficient production and maintains our standard of quality. Choose wisely . . . Choose steel . . . it's strong . . . it's permanent it's quicker—and cheaper too !

What the price includes:
Our buildings are treated with cold galvanising paint at the works with an additional coating of chlorinated rubber paint after erection. (If required, an initial shot-blasting process can be used at a small extra cost.)

Price includes complete structure with Standard Six Asbestos sheeting to roof and gable peaks, all rainwater goods and erection on site within 50 miles of our works, additional price pro-rata on distance.

SIZES AND PRICES	
All buildings are 12ft to eaves	30ft. span x 60ft. long, **£675/—/—** 30ft. span x 80ft. long, **£870/—/—** 38ft. span x 80ft. long, **£1120/—/—** 38ft. span x 100ft. long, **£1350/—/—** 48ft. span x 80ft. long, **£1350/—/—** 48ft. span x 100ft. long, **£1625/—/—** 60ft. span x 100ft. long, **£1950/—/—** 70ft. span x 120ft. long, **£2730/—/—** 80ft. span x 120ft. long, **£3240/—/—** 90ft. span x 140ft. long, } on 100ft. span x 140ft. long, } application

Extras: Functional and special adaptations
Quotations for side and end sheeting, grain sheeting, sliding doors, ventilation, insulation and lighting panels on application. Preparing and casting concrete bases at small extra cost. The overall length of the buildings can be increased or reduced to suit special requirements with an appropriate price adjustment.

All buildings qualify for Ministry of Agriculture Grant, where applicable.

This sign is your assurance of quality in design and workmanship

FABRICATIONS IN STEEL — K&B — STRUCTURES

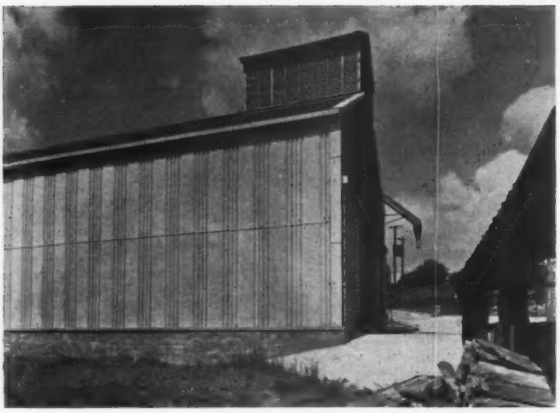
KNIGHT & BUTLER LTD

STRUCTURAL ENGINEERS

CROWHURST ROAD WORKS, LINGFIELD, SURREY

Telephone: Lingfield 2132-3-4

Write or phone for illustrated folder



Grain store at Odell Castle, Beds., showing work and drying area. Side cladding using strong profile of asbestos cement panel sheets above a brick plinth

romantic sentiment must go by the board. Cottage orne, to be good, will cost twice the norm, and a poor pastiche of plastic thatch and fake timbers is unsightly. Hence, the functional tradition. It is the desire for direct use of materials, clear construction with co-ordination between materials used, and structural technique in which building resources are not wasted. This is the modern designer's creed and where is it more appropriate than in farm buildings?

Yet the problem of appearance is confused. It is an amateur's paradise. Everyone is willing to say he likes this, hates that. Such statements are meaningful only if the criteria for judgment can be used uniformly within situations of widely different circumstances. You must be able to assess the amenity value (utility and appearance) of a power station, a petrol station or a farm building by the same standards. Similarly, you must approve or reject a cubicle house, a tower silo or a potato store by common criteria. Otherwise, how else does a planning committee reject one scheme as 'an undesirable intrusion in the landscape' but accept another? What should planning committees look for and how can their judgment be uniform and unbiased?

In the first place, planning legislation has to control two functions of building—location and appearance. In legislation these two requirements are not clearly defined, which leads to confusion. Considering the latter only, this also has two component parts, especially when considering industrial and farm buildings. Firstly, there is the functional requirement and the co-ordinated synthesis of building design with that function within the technical and economic parameters accepted in agriculture. Too often farmers insist that a certain building is the only one suitable for their needs. Quite often this is just not true since their needs have not been properly defined. Even if the functional analysis is correct, it is rare for only one building solution to be valid. So how is the final choice made? The second component of appearance, closely related to functional requirements, is the choice of structure and materials and the detail of services and junctions between materials.

Co-ordination of structure, materials, services and agricultural needs is a technical problem. The man who is a technocrat in agriculture and in building may well produce good buildings. Few farm buildings are really produced by technocrats in both skills. This is the nub of the visual problem.

FARM BUILDINGS

A STUDY OF THE LONG-TERM EQUIPMENT OF THE FARM, INCLUDING LAYOUT, DESIGN AND SERVICES, FINANCIAL APPRAISAL AND CONTROL

FIRST EDITION

By R. B. SAYCE, F.R.I.C.S., F.L.A.S.

The book is sound value for money—in fact a 'Best Buy'.—*Agriculture* **75s.**

THE REPAIR AND MAINTENANCE OF AGRICULTURAL PROPERTY

By J. W. HOULDSWORTH, F.L.A.S.

This book covers the repair and maintenance of 'fixed equipment' of agricultural holdings, which as defined in section 94 (1) of the 1948 Act includes, in addition to buildings affixed to the land, works such as: roads, embankments, waterworks, drainage, electrical supply, hedges, ditches, etc.

CHAPTER 11. UNIT PRICED ITEMS. This chapter sets out 250 items, with full specification, giving the cost of repair or replacement. **35s.**

THE ESTATES GAZETTE, LTD

151 WARDOUR STREET, LONDON, W.1 Tel.: 01–437 0141

Cattle Courts on Brunton Farm 120' clear span 220' long.

ESTABLISHED 1835

CROGGON & COMPANY LTD

POYLE STEELWORKS · COLNBROOK · Nr. SLOUGH · Tel: Colnbrook 2501

STEEL FRAMED BUILDINGS combine strength and adaptability with low cost and reliability. Available in an extensive range of standard spans, heights and lengths or to special requirements. *Please write for leaflet*

Croggon

plywood pays off around the farm

Cost-saving, versatile Canadian Fir Plywood gives you quick, rugged construction using your own labour and simple tools. Easily worked, with little waste, this durable material clads portable and permanent structures of every type, including standard frame construction, clear-span rigid frame, and portal frame buildings. Later additions and modifications are simplified. Lightweight 8′ x 4′ panels are manufactured with completely WBP glue. Resists extremes of weather, and insect and fungal attack. Canadian Fir Plywood cuts your construction outlay *and* is grant-earning for buildings approved by the Ministry of Agriculture. For literature on Canadian Fir Plywood for farm buildings, the names of local stockists of Canadian Fir Plywood, and a list of farm-building manufacturers, write to:

PMBC

PLYWOOD MANUFACTURERS OF BRITISH COLUMBIA
Templar House, 81 High Holborn, London WC1

make sure it's Canadian Fir Plywood

PM19

Technocrats are not born, they are trained. All through the design process, co-ordination of different functions is their skill. Even so, there is nearly always more than one solution to a problem within defined parameters. To shape the final answer and to crystallize the detail, a further skill is needed. This skill should mould the design within certain canons of appearance without distorting the function.

Design for appearance has its own jargon, like any other technical problem. Terms such as scale and proportion (Golden Cut, Le Modulor, etc.), mass and silhouette, colour and tone (hue, chroma, etc.), lines of recession, asymmetry, duality, spatial interpenetration, structural expression, shadow-lines, etc., all have a precise meaning. Some of the terms are used loosely in common speech. But to communicate why one building is better than another needs precise language. This is why general articles about appearance are unlikely to get to the root of the problem.

The change of attitude about farm buildings came with the general interest generated by the 1963 conference 'Countryside in 1970'. The Country Landowners' Association and other agricultural bodies made useful contributions. Then the Farm Buildings Association in 1965 devoted their winter conference to the subject of the 'Appearance of Farm Buildings' followed by the Farm Buildings Centre's conference in 1968 on 'Farm Buildings in the Landscape'. The Royal Society of Arts in 1968 also had a major lecture from Mr. Noel White on the subject. In the same year one commercial company, Atcost Ltd., had a photographic competition to show their buildings in the landscape. More recently the Country Landowners' Association has had its award scheme for economic farm buildings in the landscape, the Ministry of Housing is producing its handbook in the near future and the Council of Industrial Design their report on tower silos in the landscape. These things could not have happened prior to 1963.

It is difficult, perhaps pointless, to suggest standard rules to improve farm buildings design. I am certain prefabricated components, well co-ordinated, are the real answer. I believe these should receive a hallmark if well designed, absolving them from planning permission with regard to appearance (retaining the permission for location). Modern materials are completely acceptable in the countryside provided proportion and position are correct. Perhaps there are three rules worth mentioning:

1. Keep a contrast of colour/texture between walls and roof with firm eaves shadow-line and generally reduce the dominance of the roof area.
2. Integrate all projections (such as fan chambers) with the main building or make them act as a foil.
3. Make sure that services, electrical supply, fences, concrete perimeters, slurry tanks, etc., are neat.

Over-riding all design problems is the need for attention to detail and the removal of derelict junk. Good design should only cost more than bad design in one respect: some one has to be paid to stop and think. But, careful thought usually saves money by making the investment technically better. Occasionally, some extra expenditure is justified, for example, a coloured impregnated asbestos sheet for either wall or roof to make a contrast, when both are clad in asbestos. Such additional costs should be less (as a guide) than 6*d.* per sq. ft. Even sixpence with normal depreciations, is well under one penny per sq. ft. each year—and grant can be claimed for costs related to improved appearance—in cattle housing one extra gallon each year would cover cost.

Modern Materials for Farm Buildings

J. D. Young

DURING the past few years a number of new materials have come on to the market which are likely to have a significant effect on farm building design. Up to the present time these materials have, in general, been used to replace older materials in traditional forms of construction, and have consequently not had any great impact on our farm buildings. However, the potential of many of these materials will not be realized until new building systems are evolved round them which utilize their structural properties more effectively. And few farmers or designers are going to specify new materials where proved materials will do a similar job at no extra cost. In the final analysis the popularity of these new developments will depend upon their ability to reduce operating costs.

In considering the more important new developments it will be convenient to divide them into the following groups according to their base material: timber, steel, asbestos and plastics.

Timber

Although timber is used to a great extent throughout the building industry, its use for farm buildings is not as widespread as it could be. In recent years, timber construction has dominated the 'package deal' market for the smaller classes of livestock. With the larger span buildings timber has been at an economic disadvantage but, with improvements in stress grading, the development of nailed and glued joints and the increasing availability of home-grown timber there could be an appreciable reduction in cost. However, although the initial cost may be marginally higher than other structural materials, it should be recognized that a timber structure by its very nature can readily be modified, often by farm labour, to meet the changing pattern of farming. Even at the end of its useful life, there is a high recovery factor in the timber itself so that a large proportion of the original structure can be re-used to serve another function. Timber used to be regarded as a short-life

A LONG TIME TO GO

There is no better wood preservative than Creosote and it is one of the few wood preservatives (and certainly the least expensive) that can also be applied by the hot and cold open tank process

Creosoted Timber is an ideal material for all outdoor structures and will last indefinitely eliminating both maintenance and replacement costs.

CREOSOTE

A BRITISH PRODUCT

Information on the supply and use of Creosote can be obtained from the Technical Adviser (Timber Preservation) of the

ASSOCIATION OF TAR DISTILLERS

(Dept. A) 9 Harley Street, London W.1. 01-636 3833

material under farm conditions, but with modern methods of preservation it is now a 'permanent' material requiring the minimum of maintenance and yet still retains its attractive appearance.

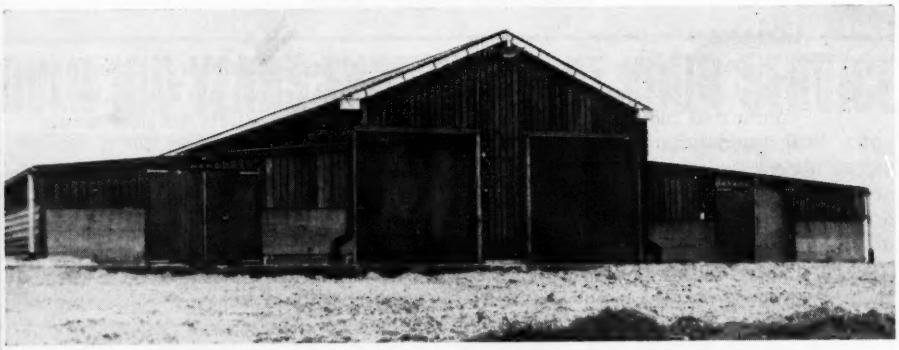
But it is the newer timber products that provide the greater potential. Exterior grade plywood combines lightness in weight with great strength and its use in panel walling is bound to increase. In specifying plywood it is essential to obtain a properly graded material designed for exterior use as it is liable to mechanical damage if treated roughly. Plywood is now being used in structural framework and the strength/weight ratio of plywood box beans is very favourable.

Oil-tempered hardboard is another material becoming increasingly popular in this country although it is still treated with great caution. It has been used in Scandinavia for a number of years with great success although the climate there is different from ours. There are still doubts as to its durability under conditions of continual high humidity which are found in the western parts of Britain. There are a number of buildings at the National Agricultural Centre where oil-tempered hardboard has been used for up to three years and it has not shown any signs of structural deterioration or attack by dung and urine. It can, however, be damaged by impact, and continual abrasion will wear it away over a period. A new development is an oil-tempered hardboard with an epoxy coating on one side. Developed for use as formwork in concrete construction, this material would seem to have great potential as a lining for dairy and parlour walls.

Steel

Steel has long been a popular material for agricultural buildings and there are many steel dutch barns on our farms which are over 40 years old and still serviceable. As a material it is comparatively cheap and has no rivals for the construction of the wide-span framed buildings (over 60 ft) that many farmers now demand. Its greatest limitation is that it needs maintenance, especially under the conditions of high humidity found in many livestock buildings. It is now possible to obtain structural steelwork that is galvanized after manufacture and this will provide a long maintenance-free life. For many years the rolled steel joist (R.S.J.) and channel have been used but other sections such as the universal beam (U.B.), rectangular hollow section (R.H.S.) and Zed section are being increasingly specified. Used correctly these sections can achieve considerable savings in weight and, therefore, savings in cost too.

The ubiquitous 'corrugated iron' sheet has been undergoing a facelift and the new galvanized steel sheets have improved structural properties with little increase in cost. The use of high-tensile steel has produced a 28-gauge sheet with the structural properties of a conventional 26-gauge sheet, and it will be interesting to see whether it has an equally long life without maintenance. Trapezoidal profiled sheets have been laid on roofs with the corrugations parallel to the ridge thus saving purlins. And various other profiles have been developed as retaining walls for bulk storage of grain and potatoes. A computer is now being used in an attempt to find the most efficient profile for certain uses such as roofing, cladding and storage. The bonding of a plastic material to the steel sheet has produced a material that needs no maintenance for at least ten years and which can be obtained in a variety of colours.



COW CUBICLES

Low initial outlay
Ministry approved

Labour saving
Good food conversion

Sizes available for Herds of 78 and up.

Details sent on request

ANDOVER TIMBER CO. LIMITED
MYLEN ROAD, ANDOVER, HANTS. ANDOVER 3451/7

IONOLAC protects and decorates machinery, barns and outbuildings. For less than 2d per square foot.

COLOURS? Choice of 15, plus black and white
FINISH? High gloss
APPLICATION? Easy, by brush or spray
PROTECTION? Excellent against rust and chemical corrosion under the most rigorous climatic conditions
COST? Less than 2d per square foot *for 2 coats*

Write for shade card and further information or see your local agricultural merchant.

Expandite A BURMAH COMPANY
Expandite Limited · Chase Road · London NW10 · 01-965 4321
Northern Sales Office: Birchley Street, St. Helens, Lancashire. Telephone: 27376

E486

Asbestos

Asbestos is naturally popular amongst farmers because it is cheap and free of maintenance over a very long period. It has two main limitations, its colour and the ease with which it shatters. Asbestos sheets are now manufactured with an integral blue-grey colour, which is acceptable to most people, and in a number of new profiles which assist in relieving the monotony of the vast expanse of roof in many modern buildings. Sheets can also be obtained with a factory-applied coat of paint in a variety of shades, but these sheets need regular, if infrequent, maintenance.

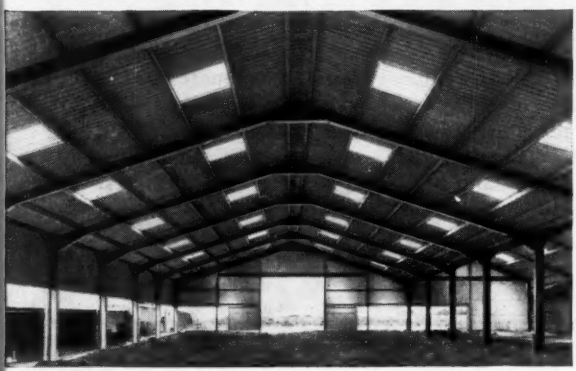
Two recent developments of asbestos sheets have, to a large extent, overcome the problem of shatter. Fully-compressed asbestos sheets have been marketed for two or three years but only recently has their full potential been realized. Half an inch thick 8 ft $\times$ 4 ft sheets have been successfully used in weaner pens at the National Agricultural Centre with support only at each end. There have been no failures and this material is undoubtedly extremely strong as well as being resistant to attack by dung and urine. What is not yet proved is whether, like conventional asbestos sheeting, it becomes increasingly fragile with age. Extruded asbestos panels are now being manufactured in this country on licence from America and have been developed as thrust-resistant walling for crop storage. The normal panel is 2 in. thick, while the retaining panel is 4 in. thick, and both are of honeycomb construction. These panels are reasonably light (an 8 ft $\times$ 2 ft $\times$ 4 in. thick panel weighs less than 2 cwt) and are extremely strong. They have a high resistance to impact but even when pierced they do not shatter and the hole can be repaired with concrete grout. Extruded asbestos appears to possess the durability of concrete without its weight disadvantage and could make a real contribution to farm buildings if the price proves competitive.

Plastics

Today, plastics account for a very small proportion of the materials used in agricultural building, nevertheless, their advantages are slowly being appreciated. An article in the April, 1967, issue of *Agriculture* described in some detail ways in which plastics were finding a use in farm buildings. More recently, polythene sheeting has been used experimentally to clad buildings of light tubular framework and it is very cheap. Unfortunately it deteriorates in sunlight and usually has a life of between one and two years only. A nylon-reinforced sheeting is now available which is very strong but its life is, as yet, unproven. Butyl rubber is more expensive than polythene but is stronger and longer lasting. It is widely used for reservoirs and may well be used as a cladding material in the future.

Until recently, glass fibre and expanded polystyrene have been the most-demanded materials for insulation but both require efficient vapour sealing to be effective. Modern methods of extruding polystyrene and polyurethane foam have produced materials with a much closer cell structure which are far more resistant to water vapour, as well as being more efficient insulators. Polyurethane foams can be sprayed on the buildings as well as being available in sheet form. An exciting development this year has been the production of laminates of rigid polyurethane and steel, plywood, hardboard or aluminium. The availability of a single sheet which combines a weatherproof exterior with a high degree of insulation must open new possibilities of industrialized farm buildings. At present the technologists are ahead of the designers and

OVER 100 YEARS EXPERIENCE AT YOUR SERVICE



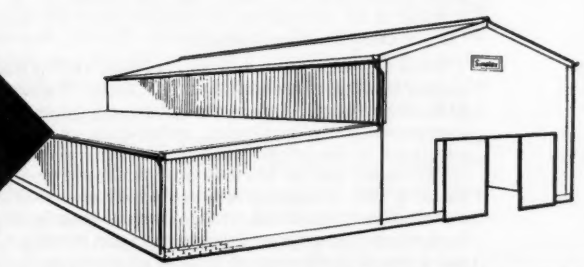
The manufacture and construction of farm buildings has been the specialised business of John Elwell Ltd., for over a century. And they specialise in quality and delivery too. John Elwell Ltd. can meet requirements for Dutch Barns and Agricultural Buildings of all types, and also manufacture galvanised Pig and Cattle Troughs, Fencing Standards, Netting Stakes, Wheelbarrows etc.

JOHN ELWELL Ltd

ROOD END IRONWORKS, OLDBURY, WARLEY, WORCS
Tel: 021-552 1415 (4 lines)
Grams: "Sections, Oldbury"

THE *SPECIALISTS* IN THE MANUFACTURE OF ALL TYPES OF AGRICULTURAL BUILDINGS

THIS COULD BE THE FARM BUILDING YOU'RE LOOKING FOR



If you want a simple farm building, without complicated variations, have a basically level site, and can erect it yourself—congratulations! You can take advantage of the new, low cost building system developed by Simplex. Available in a variety of sizes, for use as cowhouses, dutch barns, grain and potato stores, pig units or implement sheds. Erection is simple. Quality is high. Design is excellent. Cost is low. And you can pay over 5 years at only 4½% p.a. interest. Send the coupon for full details.

LOCOST
FARM BUILDINGS
Another new development from
SIMPLEX OF CAMBRIDGE

To:
M. M. A. Fletcher, Simplex of Cambridge Ltd. (Ref. 10), Sawston, Cambridge. Sawston 3281

I like the sound of LOCOST, send the facts.

Name .....

Address .....

.....

.....

.....

Simplex OF CAMBRIDGE

the price is high, but the next twelve months are likely to see the introduction of at least one building system designed round these laminates.

Many of these modern materials can be seen at the National Agricultural Centre both in use and in static displays. The Farm Buildings Centre is assembling an exhibition of the basic materials used in farm buildings, where materials can be handled and compared. Associated with the panels will be information sheets designed to enable visitors to compare the relative advantages and limitations of the materials shown. In the livestock demonstration areas and in many other permanent buildings at the National Agricultural Centre these materials can be seen in use. While no attempt is made to evaluate their performance scientifically, observations of these new materials under working conditions can be of great value to the potential user.

Home-Grown Cereals Authority

"CEREALS IN THE U.K.—Production, Marketing and Utilisation"

by Professor D. K. Britton, M.A., B.Sc.(Econ.), University of Nottingham.
Associate Authors: B. E. Cracknell, B.Sc.(Econ.), Ph.D. and I. M. T. Stewart, B.A.

In May 1966 the Authority commissioned Professor D. K. Britton the Head of the Agricultural Economics Department of Nottingham University to undertake an independent survey of the U.K. Cereals Market and to submit a report to the Authority. The Report (The 'Britton Report') has recently been submitted to the Authority and was published on 20th February, 1969. It is entitled 'Cereals in the U.K.—Production, Marketing and Utilisation'. It runs to some 830 pages, and is priced at £8. Copies may be obtained from any bookseller, from Pergamon Press Ltd., or direct from the Authority.

When the Authority was formed in June 1965 it discovered a great dearth of up-to-date information about the U.K. Cereals Market, which has to deal with some £550 million worth of domestic and imported cereals a year, involving large capital investments at the production, distribution and final processing stages. This was underlined by the fact that the last publication giving anything like a complete survey of the market was the Ministry of Agriculture's report on 'The Marketing of Wheat, Barley & Oats in England & Wales' which was issued in 1928. The Authority wanted a factual basis on which to formulate its own longer-term policies, a benchmark from which future market developments and trends could be measured and evaluated, and a source of reference of value to all operating in the cereals market. The Britton Report meets these needs.

The launching of the project was considerably helped by a substantial grant from the funds of the Agricultural Marketing Development Executive Committee (A.M.D.E.C.).

The Report includes subjects under the following headings:

Origin and objectives of the Report.

Method of working.

Summary of results.
- Grain Production & Marketing by farmers.
- The Merchants and Shippers.
- Grain Marketing in other countries.
- Price behaviour in the U.K. market.
- Policy for cereals and the role of the H.-G.C.A.

Conclusions and recommendations.

Organization of Markets for

Beef and Veal

in the Common Market

R. C. Rickard

On 29th May, 1968, the Council of the European Communities adopted basic regulations for the common organization of the market for beef and veal, and the market for milk and milk products. The appropriate arrangements were implemented in the six member states from 29th July—some four months later than was originally intended.

Throughout their lengthy deliberations both the Council of Ministers and the Commission maintained that the two markets, beef and dairy, should be linked. The partial deficit in beef and veal and the heavy surplus in the dairy market have posed a particularly difficult problem and, far from being treated separately in a common market organization, the two sectors will have to develop simultaneously as integral parts of a combined programme.

The importance of the negotiations in the milk and milk products sector and the difficulties surrounding them have tended to overshadow the decisions eventually concluded for beef and veal. In formulating the beef and veal arrangements, member states and the Community institutions generally, agreed that production in the E.E.C. should be encouraged. Beef and veal constitute one of the few agricultural sectors where production still remains considerably below demand, and this in itself is increasing appreciably.

Apart from being one of the few commodities in which demand exceeds production, it is important that livestock producers should be encouraged towards beef rather than milk. The maintenance of producer prices for milk is already likely to be a considerable burden on Community funds. This differs from the position in beef where imports are likely to remain important, especially for Italy and Germany. Moreover, imports of beef and veal play a significant role in the maintenance of good commercial relations between the Community and certain third countries such as Denmark, Austria, Argentina, Uruguay and Yugoslavia which are the Community's traditional suppliers.

Unlike the market regulations for pigmeat and for eggs and poultry, both of which are based on the prices of cereals used in the production process, those for beef and veal use the maintenance of guide prices as the principal means of support.

The guide price

The guide price is the vitally important factor in determining the level of producer prices in the E.E.C. in any year, but it is in no sense a guaranteed price. It is, in fact, the price which it is considered desirable for producers to obtain under normal market conditions. It is also very close to the concept of the target price for milk, since both prices represent goals to be aimed at and indicate in large measure the price around which the market price will fluctuate during the year. Guide prices for both live cattle and calves are determined before 1st October each year and are valid for the marketing year beginning on the first Monday of the following April. There is no provision for seasonal adjustments during the year. Guide prices for the current 1968–69 period* are as follows:

	Per live cwt
Cattle	287*s.* 10*d.*
Calves	387*s.* 4*d.*

There are two principal methods of endeavouring to secure that producer prices will be similar to the guide price. The first method is a system of protection against imports from third countries by means of a combination of customs duties and variable levies. The second method is an intervention system.

Customs duties and levies

With some exceptions, the customs duties are permanently applied under one of two rates—16 per cwt *ad valorem* for live animals and 20 per cent *ad valorem* for meat. In addition, levies can also be applied under certain conditions. They are, in effect, a form of supplementary protection at the frontier. The levies on products other than animals are normally calculated by means of co-efficients expressing the price relationships between the products and live animals—calves or fat cattle.

There are three elements in the determination of the levies:

1. The Community guide price.
2. The Community market price which is based on the weekly prices at representative markets in the E.E.C.
3. The import price which is determined from the weekly prices in certain representative markets in third countries. The import price of calves is calculated on the basis of prices on representative markets in Denmark; that of fat cattle is derived on a weighted basis from the average weekly price quotations in Austria, Denmark, England and Wales, and the Republic of Ireland.

The levy is calculated weekly and consists of the difference between, on the one hand, the guide price and on the other, the import price quotation, plus the customs duty and certain additions for transport costs and quality differences. If the market price in the E.E.C. is lower than the guide price, the entire levy is applied. As the Community market price increases relative to the guide price, the proportion of the levy to be applied gradually decreases and is removed completely when the market price exceeds 106 per cent of the guide price.

Market intervention

In order to stabilize producer prices, the guide price is supplemented by comprehensive Community intervention arrangements. It should be noted,

*The 1968–69 marketing year commenced on 29th July, 1968, and will therefore last for only eight months.

however, that the system of market intervention applies only to cattle and to beef, calves and veal being excluded.

Market intervention may be undertaken by national intervention agencies or by private firms. Both types of organization are supported financially from the European Agricultural Guidance and Guarantee Fund into which 90 per cent of the revenue derived from the levies and, if necessary, contributions from member States are paid. Intervention in the beef sector may be discretionary or mandatory. Discretionary intervention in the form of support buying is undertaken by individual member States, whereas compulsory intervention is carried out on a Community scale.

Discretionary intervention can only be undertaken when the Community market price for cattle falls below 98 per cent of the guide price and when the prices of certain prescribed qualities and types of cattle in a member state or in a particular region of a member state is below 93 per cent of the guide price. Intervention becomes compulsory throughout the Community when the market price is below 93 per cent of the guide price.

Restitution payments

A system of restitution payments or export refunds is in operation which allows member states to participate on a competitive basis in world trade for beef and veal. The restitution, generally speaking, represents the difference between the world market price and the price ruling within the Community. For products other than calves and fat cattle the restitution payments are calculated by means of co-efficients identical to those used to determine the levies on such products.

Thus far the market regulations are fairly straightforward, but there are modifications for certain products, mainly young store stock and frozen beef.

Calves and young cattle

Calves, defined as animals weighing less than 176 lb, and young male cattle between 484 and 660 lb can, under certain conditions, benefit from special import concessions. When the Community market price for calves is above the guide price, the levy on young cattle is either reimbursed or not applied; the levy on calves is not applied and the customs duty is reduced by a half. The purpose of these measures is to obtain a larger number of store stock for further fattening in the Community and to augment the production of meat without an increase in the number of cows and, consequently, in the production of milk.

Frozen meat

When drafting the beef and veal regulations the Commission recognized that the market for frozen meat possesses certain characteristics which make it quite distinct from the market for live animals and that price levels on the two markets are very often unrelated. In view of this, the import price for frozen meat is calculated on a different basis from that used for live animals, fresh and chilled meat. Although the customs duty is permanently maintained on all kinds of frozen meat, special arrangements exist for certain types of frozen beef.

A distinction is made between frozen beef for direct consumption, for food processing generally, and for canning. For the first category, the

customs duty and the levy, when applicable, are on a permanent basis. Frozen meat intended for the food processing industry can be imported wholly or partly free of levy, depending on the availability of supplies of similar types of meat within the E.E.C. It is thus intended that there should always be a satisfactory supply of frozen meat to the processing industry and, at the same time, a preference is shown towards meat of Community origin when internal supplies are available. Frozen meat for canning—where the canned product must consist wholly of beef or veal with only the addition of gelatine—is exempt from the levy.

Conclusions

Such are the broad outlines of the E.E.C. system of market management for beef and veal. Much has already been achieved but some important issues still remain. For instance, the internal taxation systems for both agricultural and horticultural businesses have yet to be harmonized. Furthermore, a common policy has to be adopted with regard to veterinary and animal health matters. It is true that a comprehensive series of regulations and directives—including arbitration by a neutral body of veterinary officials in cases of dispute between importing and exporting member states —are being put into effect, but national governments have so far shown themselves reluctant to surrender their sovereign controls.

Underlying the E.E.C. beef and veal regulations, there are apparently two major considerations. First, the production of beef is considerably below demand at the present time and furthermore it is expected that demand will increase substantially in the future. Second, great stress is laid on the link between the beef and milk sectors and it is hoped that favourable beef prices will help to check the rising trend of milk production and reduce the burdensome surpluses of dairy products. Since July, 1968, however, market intervention measures have been consistently in force on the beef market. Since only the experience of a few months is available, it is obviously too early to draw any definite conclusions, especially since market intervention has been mainly directed towards the poorer quality animals. However, there is a danger that, in fixing a beef price as an attractive alternative to milk, the strength of demand for beef may become a secondary consideration. It is extremely doubtful, however, whether price policies alone can rectify the present imbalance between beef and milk production. A large proportion of the milk produced in the E.E.C., roughly 25 per cent, comes from holdings with five dairy cows or less. It would obviously be unrealistic to base prices of milk for all dairy herds on the economics of herds of this size and this sentiment would also, no doubt, apply to other products. The only permanent solution, as the Commission has recently declared, is the adoption of common measures designed to improve the structure of farming, and thereby, it is hoped, achieve a satisfactory balance between milk and beef.

This article has been contributed by **R. C. Rickard, B.Sc., Econ. (Lond.)**, a lecturer in the Department of Agricultural Economics, University of Exeter.

One of the many types of tankers in operation

Disposal of

Farm Waste — Mechanization

Warner K. Hall

BEFORE discussing any mechanization for waste disposal, it is important to determine and define the type of slurry or waste produced by the livestock enterprises. Over the past few years a considerable amount of work has been done in this field and the following has proved to be a useful classification of slurry types:

1. Water slurry: up to 10 per cent dry matter; flows easily.
2. Thin slurry: up to 12 per cent dry matter, like thin porridge; flows to maintain a nearly level surface when pumping.
3. Thick slurry: about 15 per cent dry matter, like thick porridge; flows slowly.
4. Very thick slurry: about 20 per cent dry matter; hardly flows at all.

Pig and poultry wastes have similar properties to cow waste but appear thinner, particularly at and above 15 per cent dry matter. Slurry from beef fed on a barley diet is often stickier at the thicker levels than that of cows. Type of feed has a considerable effect on the flow properties of any material.

For final disposal, the slurry can be divided into three main classes:

Solid (dry matter over 20 per cent)
Semi-solid (dry matter from 10 to 20 per cent)
Liquid (dry matter up to 10 per cent)

Solids (dry matter over 20 per cent)

Most farms with livestock are accustomed to handling traditional farmyard manure. By modifying the existing farmyard manure spreaders and adding a large bucket to the foreloader it is possible to handle this solid slurry effectively.

New farmyard manure spreaders can be fitted with special attachments, and modern foreloaders which have hydraulic control to the bucket enable this material to be handled more efficiently. A swinging arm hydraulic ditch digger can be fitted with a grab which reduces the fatigue of the tractor driver when loading this type of material.

Semi-solids (dry matter from 10-20 per cent)

Semi-solid material will be found in areas where slurry can be kept free from rainfall, i.e., in covered feeding, lying and loafing areas. It is a material which can be handled by a large bucket on a foreloader and can be moved around the farmstead by a rear tractor scraper. Modified farmyard manure spreaders can handle this semi-solid matter and so can a general-purpose tipping trailer.

For loading it on some farms, it is possible to build a slurry ramp. The slope for such a ramp is ideally one in ten. It should be provided with substantial side walls and a safety guard at the top end.

In other situations, a slurry auger or bucket elevator can be used to lift this material from a small sump. On the market there is a pump unit having a submerged centrifugal pump with large clearances, which may also be used for transferring this waste either into a container for disposal or into storage. Where the material is of 10–15 per cent dry matter it can be handled by tanker.

Tankers

Tankers can be divided into three main types:

1. Vacuum tanker
2. Open spreader with auger feed
3. Rotary-flail spreader

These are all wheeled containers and their use in the winter is therefore limited, especially when some of the larger tankers can weigh over five tons fully loaded.

Vacuum tankers. Various types of tanker are available, but their main difference is in their method of discharge. All are filled by exhausting the air inside the tank by means of a vacuum pump. For discharge, the simplest form is a valve at the rear which discharges the waste on to a driven spinner. Alternatively, with some tankers the exhaust air from the vacuum pump can be used to pressurize the air above the tank contents and force it out through a jet at the rear while travelling overland, or through pipelines and a raingun when travel overland becomes impossible.

Another alternative is to have a muck pump fitted to the tanker, and for disposal this can discharge through a jet at the rear of the tanker or, again, through pipelines and muckgun.

Open spreader with auger feed. These are basically open top steel tanks on wheels. In some types, an auger is fitted in the base which passes

material through the outlet to a power driven spinner. They can only be used for disposal over land.

Rotary-flail spreader. These spreaders can be used for waste of very varying dry matter content, but work effectively with this semi-solid material. It is wise to consult the manufacturers to determine the best settings for use with this material, but generally it is advisable to tie back alternate chains and the two chains nearest the driver to the centre tube.

In storage all semi-solids tend to settle out and it is, therefore, important to have some form of agitation available to make disposal a simple task. This agitation can be provided by the exhaust air from one of the larger tankers, but this is only effective in small storage areas. Alternatively, for these tanks and for larger tanks of over 10,000 gallons some form of tractor driven agitator can be used.

Liquids (dry matter up to 10 per cent)

For disposal by pump most liquids will need to have a dry matter of around 6 per cent. This means that a considerable amount of water has had to be added to achieve this dry matter.

For all liquid disposal systems agitation is essential. This can be provided by a tractor driven agitator, as previously mentioned, but because labour is used while this is operating, it is often more effective to have a fixed unit in the storage tank having horizontal agitators which are electric-motor driven and can be effectively controlled by a time-switch, thereby reducing the labour content for this task.

Various pump units are available. The cheapest are centrifugal pumps which have large clearances, enabling them to pass a fair amount of solid material. They do, however, need to be primed before operation and it is also important to reduce the amount of long material such as straw and silage with these units if they are to work effectively. Alternatively, pump units such as the piston pump or the eccentric shaft type can be used to pump waste over considerable distances or heights.

The piston type has wearing and movable parts and its first cost is high. The eccentric shaft pump has a steel shaft revolving in a rubber stator and it is important to avoid pumping abrasive materials, when maintenance costs can become high.

Many pump units have in the past been fitted with 'choppers'. These are rarely effective with straw or silage. One pump unit has a power driven cutter at the base of the inlet pipe. From the pump unit the waste is transferred to the field by pipelines. Most of these pipelines will be above ground although it may be advisable to fit underground pipes around the farmstead and roadways. Portable pipelines are usually of aluminium or galvanized steel and available in 20 ft, 35 ft and 40 ft lengths. With all pump disposal systems it is advisable to have a supply of clean water available to enable pipelines and equipment to be washed through after use.

For application in the field a muckgun is used which has an expanding rubber nozzle to clear blockages. Most systems should be provided with two muckguns and a change-over valve for effective operation. All muckguns are similar in operation and will cover 0·6 acres at one setting at a pressure of 40 lb per sq. inch.

Because of the great range of equipment available to deal with waste in any form, it is most important to determine the type of waste being produced by the livestock unit. Only then can the correct machine and system be chosen to provide an effective and foolproof disposal system.

This article has been contributed by **Warner K. Hall, N.D.A., N.D.Ag.E.,** who is a Mechanization Adviser with the National Agricultural Advisory Service in Kent.

National Institute of Agricultural Engineering

Open Days 1969

As announced last year, the N.I.A.E. is holding Open Days on Wednesday and Thursday, 7th and 8th May, 1969, when most aspects of the Institute's work will be shown by a comprehensive range of static and live exhibits.

Over 15 main subjects will be covered by examples of the Institute's research, development and testing activities. Also to be featured will be the work of the N.A.A.S. Liaison Unit and of the Overseas Liaison Unit, as well as workshop, laboratory and library facilities.

Open Days provide an opportunity for seeing the Institute's work in its entirety and all interested in any aspect of agricultural engineering and the mechanization of agriculture and horticulture are cordially invited to attend. Tickets are not necessary and the Institute will be open from 10 a.m. to 4.30 p.m. on each of the days. Free car and coach parking facilities will be available and there will be licenced catering arrangements.

The attractive Park and Gardens containing several buildings of historic interest will be open to all visitors.

Further information may be obtained from:

The Information Department of the National Institute of Agricultural Engineering, Wrest Park, Silsoe, Beds. (Tel. No. Silsoe 421 Ext. 102).

National Conference and Exhibition 1969

The fifth annual 'British Growers Look Ahead' National Conference and Exhibition which is being organized by the National Farmers' Union is being held at the Congress Theatre, Devonshire Park, Eastbourne from 25th to 27th March, 1969. The conference and exhibition, which will be greater in scope and size than the four previous events, will be opened by Sir Basil Engholm, K.C.B., Permanent Secretary to the Ministry of Agriculture, Fisheries and Food.

21. West Huntingdonshire

A. N. Chamberlain

THIS relatively small district of some 67,000 acres lies between the Great North Road and the Northampton border. It is very rural in character and scenically appears as a series of smooth, well-rounded hills, and broad, quite shallow valleys, that can be likened to ridge and furrow on a vaster scale. Although the landscape is punctuated by the church spires of numerous villages and hamlets, it boasts but few other man-made features. One of the most striking of these is Grafham Water—the largest artificial lake in England. Among its many attractions fishing and sailing may be mentioned and people gather there from far and wide to pursue these and other aquatic sports.

The soils of the district are derived mainly from Oxford or boulder clay, but in the valleys the sand and gravel content increases and, especially close to streams, soils can be quite light.

Agriculturally, West Huntingdonshire is now dominated by the cereal crops, winter wheat and spring barley both being very important. The main break crops are peas, beans, potatoes and sugar beet, but on some farms the heavy nature of the soil has led to a severe reduction in the acreage of cash roots, or to their complete elimination. This change means, on the one hand, that in a wet autumn there is no sugar beet or potato crop to lift, so that ploughing and wheat sowing can be carried out earlier. On the other hand, it greatly reduces the number of suitable break crops which can be used to maintain an entry for wheat and, at the same time, show a profit in their own right.

Farms on which these changes have been made have moved to a system of large-scale intensive cereal growing. They are highly mechanized, with powerful tractors, large capacity combines and efficient grain driers. Consequently, their labour usage is low, with one man being required for up to 200 acres. On such farms break crops tend to be restricted to those that can be handled with the corn growing equipment.

Alongside this system of farming, more complex rotations can be found throughout the district, and an example of the latter type of farm is that of Messrs. T. Brown and Son, Bottom Farm, Covington. This is essentially a family concern, founded by the late Mr. T. Brown in the latter part of the last century and now run by his son, grandsons and great grandchildren.

The first parcel of land at Bottom Farm was bought to operate in conjunction with the butchery business founded by Mr. Brown a few years previously. Subsequent purchases of land up to the present day have increased the size of the farm to around the 1,000 acre mark. The whole farm is now run as a company, with land ownership split up between members of the family.

In the early days sheep and cattle were of most importance, being needed to supply the butchery business. Later, when the Cantley factory opened, sugar beet was introduced (in 1929) and became the first major cash crop in the rotation. From the beginning of the second World War onwards, grass and stock gradually gave way to arable cropping. Today all that remains of the original grazing livestock is a flock of lambs purchased in the autumn to graze the aftermath of the arable grasses. The leys themselves remain essential to the farm economy as they are a very necessary part of the rotation. This rotation begins with one of a variety of break crops, including vegetables for seed, grass, potatoes and green peas. These are followed in turn by a winter wheat and spring barley crop before returning once more to the break. It can be seen that this sequence of cropping, with its wide rotation, avoids many of the pitfalls currently being experienced by many farmers growing mostly cereals. The system helps, for instance, to control wild oats, blackgrass, eyespot and take-all, although on certain fields it has been found necessary to resort to chemicals to keep down wild oats.

In addition to the variety of crops grown, a modern piggery provides fattening accommodation for 1,500 bacon and pork pigs per year, stores being purchased from elsewhere.

The emphasis on this farm is on quality. Every commodity is produced to the highest standard. Two factors which help to make this possible are worthy of mention; these are, an adequate labour force and effective land drainage. The first is needed to attend to no less than eleven enterprises, many of them high value cash crops; thus the labour force at Covington matches the labour requirement well. The second enables cultivations to be carried out on time, which is essential to success on heavy land farms. The fact that over the years every field on the farm has been properly drained makes this possible.

Among the many crops grown, black currants and herbage seed production perhaps deserve special mention as they are both quite unusual on West Huntingdonshire farms. About thirteen acres of black currants are grown on contract and they fit into the farming pattern in two distinct ways—they use up awkward pieces of land and, secondly, use surplus labour at an otherwise slack period.

It will readily be appreciated that a complex farm like this requires very skilled management. A look at the crops and stock at Covington and the steady progress the farming economy has made to date shows very clearly that these skills are available in full measure.

Housing the Bull Beef Herd

E. Dunmore, *Agricultural Land Service, London*

SOME interest has been shown in recent years by a number of stock farmers in the fattening of bull calves for beef, instead of the customary steer. Bulls are not subjected to the stress and possible set-back due to castration, but more important perhaps is that trials have fairly consistently shown a better liveweight gain for bull calves than for steers of the same age kept under the same conditions.

Ministry regulations require all bull calves reared for beef to be licensed, and the producer's premises must be inspected to ensure that at least five bulls can be securely housed from the age of eight months until sold for slaughter, which must take place by the age of 14 months. It must also be possible to feed the animals from outside the pens, and facilities must be available for the bulls to be safely handled for veterinary and other purposes.

To inquire whether the raising of bull calves for beef causes any particular problems so far as fixed equipment is concerned, a survey has been conducted by the Agricultural Land Service of buildings and other fixed equipment on farms where bull beef animals had been, or were being kept, in small or large numbers. The survey was limited to the south-eastern part of the country, and nine farms were visited.

On all these farms the animals were housed throughout their lives, and were fed intensively on rolled barley and concentrates for maximum live-weight gain. They were normally transferred to the finishing (or fattening) house from the calf house or second-stage house at about 3–5 months, and

sold off at about 9–12 months of age. Based on the experience of these farms the following observations on the requirements for a finishing house likely to prove adequate for the purpose may prove helpful to those contemplating adopting this type of enterprise.

General layout. Covered yards, with central passageway for access and feeding, although simple open-fronted shelters with front feedway could be used successfully.

Bedded areas. Usually arranged on either side of the feedway, and divided into pens holding on average up to 30 animals. Normal space allowance, about 30–35 sq. ft per animal for the more adult stock. Floors of concrete or rammed chalk. Bedded areas littered with straw (or sawdust) every 1–3 days, and mucked out 2–3 times per year.

Pen divisions. Need to be stoutly built. They may be made adjustable in height, but if fixed, the top of the division should not be less than 3 ft 6 in. above the expected level of build-up of litter. Examples of post and rail divisions which have proved to be adequate are:

Posts	3 in. or 4 in. diameter steel tubes spaced at up to 6 ft or 8 ft centres respectively. 6 in. × 6 in. timber or 7 in. × 3 in. steel joists spaced at up to 15 ft centres.
Rails	4 in. × 2 in. timber or 1¼ in. diameter steel tubes supported at 6 ft centres. 2 in. diameter steel tubes supported at up to 15 ft centre. Rails should be spaced vertically at 12–18 in. centres; if an 18 in. spacing is used, the lowest 2 or 3 rails should be spaced at 9–12 in. centres. Gates should be adjustable for height, and positioned to provide easy and safe access to the pens.

Feeding and watering arrangements. *Ad lib* feed can be supplied by mangers (usually about 6 ft long) with large feed hopper mounted above to give constant supply of feed; one or two feeders to each pen depending upon number of animals in pen. Alternatively, continuous mangers can be used serving all pens and filled either mechanically or from a trailer. Some roughage is needed to help prevent bloat and this can be fed on the floor or from hayracks at a daily rate of about ½ lb barley straw/animal. Where pens are littered daily the cattle will eat an adequate amount of the straw for this purpose. Water can be supplied either from bowl or trough.

Weighing arrangements. Weighing is a fairly regular routine in this type of enterprise, especially when the animals are nearing the weight at which they can be sold off. Weighing can be done with a portable crush and weighbridge in the pens or feeding passage, but this necessitates considerable handling of the animals. A preferable alternative is to construct some form of internal or external cattle race, incorporating crush and weighbridge. Pen gates should be so arranged that animals can be driven out, weighed and returned to their pen, with a minimum of disturbance to the animals in other pens, and with due regard to the safety of the stockman.

From the foregoing observations it seems likely that any well-built, adequately ventilated beef housing, which complies with the Ministry licensing requirements, would be suitable for accommodating bulls up to the age of 12–14 months, provided attention is paid to the need for rather more cautious handling of the young bull after the age of about eight months.

In this respect it was noted that on all the farms visited during the course of the survey, feeding was done from outside the pens, and in many cases littering also, straw bales with the string cut being thrown into the pens and the cattle allowed to spread the litter themselves. The majority of the farmers thought there was very little difference in behaviour between bulls, whether

horned or de-horned, and steers, except that after about eight months of age bulls might be a little more troublesome; they certainly tended to ride more than steers, especially when mixed with steers. However, no farmer reported any particular difficulties in handling, or had made structural or other alterations to the accommodation previously used for steers, when changing over to bulls.

Sales resistance by some butchers, the trouble and expense of licensing, and the loss of subsidy payments should any carcasses be downgraded, may cause some farmers to hestitate in adopting this type of enterprise. But experience has shown that those who do so can expect to have their bulls finished for market several weeks earlier than in the case of steers, with consequent saving in housing, fodder and labour.

It is possible that bull beef production in the grassland regions, where the animals spend some time out to grass, may pose other problems concerning fixed equipment which were not encountered in the recent survey.

Sidney Fitch, O.B.E.

1880-1968

We record with regret the death of Mr. Sidney Fitch, O.B.E., F.R.I.C.S., F.L.A.S., F.A.I., who died suddenly in his home at High Wycombe, Buckinghamshire, on 13th December, 1968, in his 88th year.

Mr. Fitch became a Professional Associate of the Surveyors' Institution in 1904 and a Fellow in 1920. He also became an Honorary Fellow of the Chartered Land Agents' Society and a Fellow of the Chartered Auctioneers' and Estate Agents' Institute. In 1910 he joined the Valuation Office of the Inland Revenue at High Wycombe. There he played his part in the National Food Production Campaign during the 1914-18 war. After the war he joined the Ministry of Agriculture and Fisheries, on Mr. H. V. Rafferty's appointment as Chief Land Commissioner. Mr. Fitch's special responsibility at the Department between the wars was the professional work on the administration of the Universities and Colleges Estates Act. He was also closely associated with the drive, then at its height, for the creation of the smallholdings for ex-service men and women. When Rafferty retired in 1937, Fitch was promoted Chief Land Commissioner and served in that capacity throughout the gruelling years of the Second World War. He was awarded an O.B.E. in 1942.

After he finally retired in 1950 he continued to take a keen interest in estate management, serving for a time on the Buckinghamshire A.E.C. In 1952 he was appointed a Founder Trustee of the Ernest Cook Trust, set up in that year as an educational charity. The endowment of the Trust is in land consisting of seven estates totalling 17,500 acres. Mr. Fitch was an active trustee and regularly attended its meetings and visited its estates until his death.

Sidney Fitch will be long remembered by his friends for professional ability and personal charm. His experience and good sense was always available to others and many owe their progress in the profession to his advice and encouragement.

in brief

- **Broadleaves**
- **Men at work**
- **Peatland reclamation**

Broadleaves

HARDWOOD trees are no longer the main source of our utilitarian timber. Once highly prized among our natural resources as first-class building material, hardwood timber has lost place to steel, concrete and asbestos, while the softwoods from our conifer forests increasingly meet our everyday needs. Nevertheless, well-grown oak, beech, ash, sycamore and elm continue to be in good demand for high quality furniture, and their planting by the Forestry Commission and private owners is still prominent in afforestation policy. Apart from this purely commercial view, however, we should not lose sight of the landscaping value of our native broadleaved trees in national parks and private estates, nor of the shelter and shade which many of them afford in field and hedgerow. These thoughts are engendered by a new, beautifully illustrated Forestry Commission publication, *Know Your Broadleaves** (text by Herbert Edlin and drawings by Christine Darter). Most of them are deciduous, but some, like the holly and box, are evergreen.

The history of the agricultural enclosures was written across the face of England by the hedgerows, but too often nowadays they are grubbed out for immediate practical reasons and replaced, if at all, by post and wire; or else they are cut by machine that destroys many self-sown saplings that might otherwise provide some useful wood. Where, as formerly, may we still find the practice of rewarding a hedger for every young oak or elm that he preserves? or where, for that matter, may we find another generation of craftsmen hedgers?

Pride of place among our broadleaved trees must go to the oak, whose durable timber once supplied the 'wooden walls' of England's naval and fishing fleets, as well as the half-timbered buildings that still survive in pockets of the countryside. Today the demand for oak is in stout, straight logs that will be fed into the sawmill to yield long, thick planks for furniture-making; and this means that the trees must be grown close together in plantations instead of as 'standards' in coppiced woods.

But if the oak is mighty, the beech is magnificent. More than that, it is, in Mr. Edlin's words, 'the most profitable tree of any kind, broadleaved or conifer, for people to grow on chalk or limestone hills'. This fact has been recognized by the Forestry Commission who, in a typical year, plants 1,300,000 young beeches on about 800 acres of land; and they are also planted extensively on private estates. Beech makes a superlatively attractive and effective shelter-belt, and its timber has infinite uses in furniture-making and joinery.

So, too, the ash, in demand wherever a pliant, tough wood is required; walnut, whose scarcity commands high prices for turnery, veneers and gun stocks; the Norway maple, for its early flowers and autumn leaf colour; and the wild cherry, which combines a useful wood with a glorious spring display. The list can be greatly extended, and no better guide than this book could be asked for.

The present resurgence of interest in the beauty of the English countryside augurs well for our native broadleaved trees, but that of itself is not enough. In today

*H.M. Stationery Office, price 15*s*.

already walks tomorrow, and only by concern now in the preservation and planting of such trees can it be given real meaning.

Men at work

MECHANIZATION in any sphere of man's activities has seldom subordinated the machine, or environment, to the man. And this is as true of agriculture as it is of any other industry. Thus the relatively new science, with the impressive name of 'ergonomics', which deals with the capabilities and limitations of human work-performance of all kinds, has a wide field open to inquiry. Physical and psychological handicaps reduce the efficiency on which greater productivity is largely based, to say nothing of their adverse effects on workers' health. Research at the National Institute of Agricultural Engineering and Loughborough University is already making inroads into such problems that hitherto were either not realized or disregarded.

When the tractor replaced the horse as the motive power on farms it was not apparently thought remarkable that the pattern of ploughing and subsequent cultivations should be put front to back and in consequence that the driver should for ever be looking over his shoulder. Inconvenient positioning of controls on field machinery, cramped seating on transplanters and noise are obvious objections which should be eliminated by better design. So, too, tractor vibration, which gives anything but a 'feather-bedded' ride and may therefore result in a slower rate of work. Special problems arise with livestock farming, inasmuch as the animals' needs have usually to take precedence over man's. The optimum environment for housed pigs and poultry, for example, does not provide the best kind of environment for the people who work there. Monitoring by closed-circuit television and more automation may be the answer here. Inadequate lighting in inspection and grading sheds, or at the other extreme, glare from bare lamps or direct sunlight are conditions that can readily be obviated by a little thought, as also are the working heights of benches and loading platforms.

An article by John Matthews of the N.I.A.E. in the winter issue of the *N.A.A.S. Quarterly Review* well emphasizes the importance of ergonomic research as the mechanization of agriculture and horticulture continues to increase. He sums up the new thinking when he says: 'The most satisfactory way to combine the benefits of automation and manual labour is to consider the respective characteristics of man and automatic equipment and to allocate tasks so as to best suit these characteristics'.

Peatland reclamation

WRITING in the current issue of *Span*, P. J. O'Hare, of the Peatland Experimental Station, Glenamoy, Ireland, draws attention to the part that the world's peatlands may play in increasing food production. Research in this field has been gathering impetus since the first International Peat Congress was held in Dublin in 1954. Figures which have been (conservatively) estimated by J. A. Taylor and quoted by P. J. O'Hare show the global area of peat deposits to be of the order of 300 million acres, of which the overwhelming proportion (60·7%) is in the U.S.S.R. Next in order come Finland (8·2%), Canada (7·8%) and the U.S.A. (6·2%). Great Britain and Ireland contribute nearly 13 million acres (4·3%).

Policy as regards peat utilization has so far varied from country to country; in Russia the chief use of peat is industrial, while in the United States the greater part goes into agriculture and horticulture. Variations in botanical, chemical and physical properties of peat deposits, their depth and stratification, are marked, and therefore the study of plant/soil relationships is one that calls for specific care before the food-growing potential can be economically exploited.

The Glenamoy investigations and development of peatland reclamation techniques, including drainage, fertilizer treatment and mechanical working, are

important pointers to what can be achieved by a knowledgeable approach to the problems inherent in these soils. Considerations of topography and local climate will determine particular land use, but prominent among them we may expect to find intensive horticulture, grassland and afforestation. All the answers have not yet been found, but the promise is apparent. *AGRIC*

Agricultural Chemicals Approval Scheme

First List of Additions to the 1969 List of Approved Products for Farmers and Growers.

AZIPROTRYNE
A contact and residual herbicide for pre- and post-emergence control of annual weeds in Brussels sprouts, cabbages and peas.
Wettable Powders
Brasoran 50 WP (Brussels sprouts and cabbages)—**Ciba**
Pemate (peas)—**Ciba**

BROMACIL
Wettable Powders
Du Pont Hywar X Bromacil Weed-killer—Du Pont

BROMOXYNIL with IOXYNIL and DICHLORPROP
A translocated and contact herbicide for the control of a wide range of annual weeds, including knotgrass, redshank, black bindweed, mayweeds and chickweed post-emergence in spring sown cereals.
Ester Formulations
Oxytril P—May and Baker

CHLORPROPHAM with FENURON
A residual pre-emergence herbicide for the control of annual grasses and broad-leaved weeds in certain fruits, vegetables and flowering bulbs.
Liquid Formulations
Herbon Red (not on light soils)—**Herbon**
Herbon White (light soils only)—**Herbon**

DICHLORPROP
Potassium Salt Formulations
Engro DP—Esso

DICHLORPROP with 2, 4-D
Amine Salt Formulations
Engro 2, 4-DP + 2, 4-D—Esso

DICHLORPROP with MCPA
Potassium and Sodium Salt Formulations
Farmon 2, 4-DP + MCPA—Farm Protection

DIMETHOATE
Liquid Formulations
Campbell's Dimethoate—Campbell

DIURON
Wettable Powders
Du Pont Karmex Diuron Weedkiller—Du Pont

FONOFOS
An organophosphorus insecticide for the control of cabbage rootfly in broccoli, Brussels sprouts, cabbages and cauliflowers.
Granular Formulations
Dyfonate Granules—Pan Britannica

LINURON
Wettable Powders
Du Pont Linuron 50 Weedkiller—Du Pont

MCPA
Potassium and Sodium Salt Formulations
Engro MCPA—Esso

MECOPROP
Potassium and Sodium Salt Formulations
J. M. S. Mecoprop 30—Stokes Bomford

2-PHENYLPHENOL
An organic fungicide for the control of apple canker.
Canker Paint
Nectryl—S.D.C. Pesticides

QUINTOZENE
Wettable Powders
Bras-sicol Super Wettable Powder—Burt, Boulton and Haywood

Company Information

The following firm has recently joined the Agricultural Chemicals Approval Scheme:

Esso Agroservice,
Warboys, Hunts.
Telephone: **Warboys 475**

Seventh List of Additions to Supplement No. 1 of Chemicals for the Gardener

BOOTS MOSS KILLER
Now based on calomel with iron sulphate—**Boots**

FISONS MOSS KILLER with MERCURY
Based on calomel with iron sulphate—**Fisons**

I.C.I. SODIUM CHLORATE
Based on sodium chlorate—**Plant Protection**

Products previously listed for Shellstar Ltd. are now marketed by Universal Garden Supplies Ltd., 21 London Road, Great Shelford, Cambridge CB2 5DB.

Books

Farming in East Anglia. JOHN YOUNG. David Rendel, 1968. 35*s*.

For those who have kept west of the Great North Road and north of the Wash, this book provides a good introduction to East Anglian farming, and pleasant reading for those who know it more intimately.

Most types of crop and stock in Britain can be found somewhere in this part of the country and John Young shows, in a practical way, how these can be dovetailed together to form an immense variety of farming systems.

The author, who has 1,600 acres of light land in North West Norfolk, with cereals, sugar beet and polled Hereford cattle, draws on his own farming philosophies and practical details. He shows how the different farming systems are not only linked to climate and markets but more fundamentally to farm size and soil type; the rich silts and loams, the heavier soils and chalky boulder clays, the blowing sands and black peats.

Mr. Young does not limit himself to the present scene, but traces the appreciable change in farming practice over the past decades, the decline in manpower and the effects of mechanization on cereals, crops, roots, field scale, horticulture and livestock. He highlights his comments with details of the farming seasons and the work each brings, showing the careful organization the complex arable systems demand.

The East Anglian farmer is an individualist, looking at change with caution and shrewdness, and yet is quick to take advantage of the host of technical improvements which make a more profitable business.

Marketing, prices, the Young Farmers' Clubs, agricultural shows and the Royal Farms at Sandringham, all receive comment from John Young's pen. *P.B.*

The Roe Deer of Cranborne Chase. RICHARD PRIOR. Oxford University Press, 1968. 50*s*.

In 1962, the author was sent to Cranborne Chase by the Forestry Commission to study and control the Dorset roe deer. Since he is an enthusiast and a lover of roe, he could not have been given a more congenial post. He describes the nefarious history of Cranborne Chase and the changing fortunes of its deer and their hunters—a map would have been useful here—but is at his best in the woods, with the deer.

To be at home in the forest it is essential to be perceptive and inconspicuous when studying a creature as shy as the roe, especially in the changing light of dawn and dusk. Roe do not move far but range from one estate to another and can cause appreciable damage both to forestry and agriculture if not properly managed. The author is knowledgeable about the ecology and behaviour of roe and realizes the importance of the deer controller having the right equipment, from soft-soled footwear to a first-class rifle with a telescopic sight. He also stresses the need for keeping good records of all observations, the use of standard techniques for assessing relative density and the pitfalls associated with attempts to census wild mammals.

In the Chase he attempts to maintain an optimum density of roe deer and a 1:1 proportion of bucks to does, by a careful shooting plan, selective shooting and good forest management which accepts the deer as a natural part of the woodland scene, and of economic and aesthetic value.

The book closes with a useful section on the diseases of roe by Archie McDiarmid.

H.V.T.

Fundamentals of Forest Biogeocoenology. V. SUKACHEV and N. DYLIS (Translated by J. M. Maclennan). Oliver and Boyd, 1968. Twelve guineas.

'Biogeocoenology' is a Russian term without exact English counterpart. It goes beyond our 'synecology' or 'ecosystem', which imply the study of plant and animal communities in relation to their environment, by giving equal weight to all physical aspects. This Russian standpoint has long needed authoritative expression to the West, and this book does so admirably. The late V. Sukachev was an Academician, while N. Dylis is senior research scientist in the Laboratory of Biogeocoenology. Fourteen

Russian collaborators have assisted and the text is ably translated.

The Soviet Union has the world's largest forest area and remains a major exporter of timber to Britain, sending us one-fifth of our wood. The broad picture shows tundras in the north, then a great band of coniferous forests reaching across Russia and Siberia, followed further south by broad-leaved woodlands and, finally, the Steppes and semi-deserts of Central Asia. This comprehensive book surveys the whole complex, and is a valuable reference work for agriculturists, soil scientists, ecologists and meteorologists as well as foresters. There are revealing comparisons between ecosystems—an oak forest has a 'phytomass' or weight of plant organic material, 170 times that of a grassland community!

Details of forest life include acorn 'sowing' by jays—which explains the sudden appearance of oak saplings on neglected pastures everywhere. Beavers, valued for fur, have been almost exterminated outside game preserves. As they no longer dam forest streams, serious floods result. Red, and roe deer, which browse broad-leaved trees, are not a threat to timber production, but the great elk, which browses on pine saplings, proves a menace. Wild boars rooting in soil give a good start to any acorns they don't eat, while brown bears aid the spread of the large-seeded Siberian stone pine. Accurate observation of animal life is intensively maintained by Soviet scientists, and painstaking investigations are followed by thoughtful deductions.

H.L.E.

Barley Varieties. E.B.C. (3rd Edition). G. AUFHAMMER P. BERGAL, A. HAGBERG, F. R. HORNE and H. VAN VELDHUIZEN. Elsevier, 1968. £5 10*s.*

This is an authoritative description of about forty *malting* barley varieties grown in Europe. Sponsored by the Barley Committee of the European Brewery Convention this third, enlarged, edition offers an extensive description of each variety with special reference to malting quality. Dormancy, extract yield and other aspects of grain quality are compared. There are detailed accounts of ear and grain characteristics with an introductory section on methods of identification. With each description there are excellent photographs of the grain of each variety, showing clearly the spicules, rachilla hairs and other important features. The relationship of pedigrees of the more important varieties, as well as the pedigrees of the parents, are charted.

A contribution from Scandinavia gives the susceptibility of malting barley varieties to twenty-seven races of powdery mildew. This section concludes as follows: 'Although the number of races is very great, the best sources of mildew resistance seem to cover all or most of them'—a rather optimistic statement in view of recent trends in this country. Susceptibility of these varieties to other leaf and ear diseases, including rust, is also indicated.

Some readers may find the successive translation into French and German rather frustrating, whilst others will welcome this in inter-communication with breeders and agronomists abroad. This publication will surely prove invaluable to those engaged in the malting barley trade, particularly those involved in import and export of grain. The new edition is also a useful reference book on any agriculturally biased bookshelf.

R.G.H.

Beef and Dairy Management and Production. N. G. FOWLER. Hutchinson Technical Education, 1968. 27*s.* 6*d.*

This book, written primarily for students at Farm Institutes and Colleges, is published in paperback form and will be welcomed for providing, at an attractive price, remarkably comprehensive information covering a very broad field of cattle husbandry. The quality of binding may be criticized in that pages are easily detached, but the layout is clear, the photographs good and the line drawings illustrating buildings, equipment and various manual tasks are extremely effective and worthy of the highest praise.

As the author is a veterinary surgeon it is not surprising that the book is at its best in the sections dealing with common ailments, disease control and the various manual tasks necessary in cattle management. Considerable effort has been made to avoid unnecessary technical terms and experimental or unproved theories and practices. This gives the book a very 'traditional' flavour, and whilst it is generally up to date some of the recommendations regarding feeding systems and the ingredients of rations have appeared in standard textbooks for many years.

Stricter editing would have placed the discussion on the meaning of starch and protein equivalents before quoting them in actual rations and eliminated one or two loose statements such as 'Subsidised beef' and 'Nurse cows must be attested'.

Nevertheless, the book offers sound guidance to the agricultural student on aspects of cattle production and management, which have rarely been attempted in the written word and all too often regarded as part of the lore of the 'practical' man.

G.H.B.

Farming in Wales. ROSCOE HOWELLS. David Rendel, 1968. 35*s*.

This book has been written for young people and those who wish to learn more about farming in Wales. It begins by tracing briefly, in simple and direct language, the origins of farming and the basic factors which have been responsible for its development in different parts of the world.

The main influences which have fashioned the pattern of farming in Wales are described and the significance and interdependence of the lowland, marginal and hill-farming areas are clearly shown. The reader is then guided through the farming year. The main operations of each season are explained simply, yet with the understanding of one who is not only a farmer but also a reverent admirer of nature and her wisdom.

The author describes the development of the increasingly complex economic factors which play such an important role in agriculture. Simple explanations are given of such things as standard quantities, subsidies and the annual price review. The evolution of co-operation is traced from the days of communal harvesting and shearing right up to the machinery syndicates and the buying and marketing groups of today.

There is a section on the breeds of livestock which are most commonly found in the Principality and the book concludes on the vital part that education is playing in the development of the agricultural industry.

This is a well-written and excellently illustrated book which condenses a great deal of information on all aspects of modern Welsh farming into a relatively small volume.

A.L.L.

Crop Production Equipment. H. T. LOVEGROVE. Hutchinson, 1968. 50*s*. (Paperback 25*s*.)

Mr. Lovegrove has fulfilled a long-felt need among farmers, operators and students for a book that is not just a catalogue of equipment, but which provides valuable practical information to enable one to use modern farm equipment more effectively in the field.

The relatively short, descriptive, clearly-written and informative sections dealing with field operation, settings and adjustments, maintenance and safety precautions ensure that even the most experienced operator of farm equipment will acquire some new information from every chapter.

The book is laid out in chapters following the logical sequence of crop production. They range from cultivating through sowing and weed control to conditioning and harvesting. The many illustrations, over-simplified, as the author states, 'to lay stress to key points', enhance the text and, happily, are placed on the same pages as the references to them.

This is a book to be read by farmers who should ensure that their operators, particularly the younger men and apprentices, know of its existence and are encouraged to read and learn from it.

P.W.W.

The Control of the Ovarian Cycle in the Sheep. Edited by T. J. ROBINSON. Methuen, 1968. 80*s*.

Such is the rapidity at which techniques are either accepted or rejected by farmers that one can easily forget how or why a new discovery came about. A reasonable degree of control over the ewe's breeding season is now possible with the progestagen impregnated polyurethane sponges available commercially. For this, we are largely indebted to the outcome of six years of research by Professor T. J. Robinson and his colleagues at the University of Sydney. This monograph is a record of the events culminating in a new practical method for getting ewes to mate to schedule without requiring daily or frequent injections of progesterone.

The authors set out to accomplish three clearly defined objectives: (1) to find suitable progestagens which (2) could be incorporated into an 'artificial corpus luteum' for intravaginal insertion so as to (3) make practical control of the breeding

season possible. Step by step we are shown how these were achieved, though one suspects that some strides were taken in a hurry at the insistence of the piper. Thousands of ewes were used in factorially-designed experiments and all the results are presented in the text. Users of these sponges would do well to remember that their shape, size and dosage strength were determined after a series of carefully controlled trials.

Matings in the cycle immediately following withdrawal of the sponge usually resulted in poorer conception rates than in the subsequent cycle. This was shown to be the result of unsatisfactory sperm movement in the tract following exogenous progestagen treatment. This difficulty is overcome by delaying mating, especially A.I, until the second cycle when a high degree of synchronization is still achieved.

Many problems remain unsolved—perhaps this monograph could make a greater impact if it could be condensed so that more readers, including the not so affluent student of sheep production, could afford to buy it.

G.L.W.

The Management of Forests. F. C. Osmaston. George Allen and Unwin, 1968. 65*s*.

Here is a well-constructed and well-produced text-book in the best traditions of university scholarship. Its author, F. C. Osmaston, comes of a family having a long tradition of service to both British and Commonwealth forestry. His twenty-five years in the Indian Forest Service, followed by twenty-one years of lecturing at Edinburgh University and the Commonwealth Forestry Institute at Oxford, enable him to blend theory with practice to excellent effect.

The controlling of timber crops, which often need a century to mature, began remarkably early. In a first-rate chapter on its historical development, the author traces our English forest laws from the preservation of hunting, by William the Conqueror, soon after 1066, and a 'Bill for the Preservation of Woods' enacted by Henry VIII in 1543, to the Forestry Act of 1919. In France, forest laws began even earlier with the Emperor Charlemagne, in the ninth century. Modern scientific management, however, started in Germany in the late eighteenth century, and greatly influenced British practice in controlling the jungles of India, Burma, and tropical Africa, for sustained timber yields.

In 1925, our own Forestry Commission began to develop its distinctive approach to the organization of its growing forest estate. New lines of thought, based on raising crops of pine and spruce speedily, for greedy sawmills and paper-mills, replaced the slow patterns of planting and harvesting that had proved suitable for oak and teak. The computer made possible and practical the difficult calculations of likely timber yields and future profits that had baffled the classic German writers. Osmaston has kept abreast with all these advances, and his book includes examples of the latest formulae used to draw up the 'Working Plans' on which all sound large-scale forestry depends, although 'Plans of Operations' for privately-owned estates are unfortunately, omitted.

The Management of Forests is essentially a guide for the full-time professional forester. Because of the international character of its subject, it is sure to win a well-merited place in every English-speaking centre where such men are trained.

H.L.E.

Oestrogenic Constituents of Forage Plants. E. M. Bickoff. Commonwealth Agricultural Bureaux, 1968. 10*s*.

The most important example of the effect under field conditions of forage plant oestrogens on grazing animals is the infertility in sheep caused by subterranean clover in Australia. Mr. Bickoff, of the U.S. Department of Agriculture, is a member of a team that has made notable contributions to research in this subject, including the isolation of a new oestrogen from lucerne and the discovery that fungal attack of the leaves of lucerne results in higher oestrogen content. His excellent review will be of considerable value to the research worker and other readers.

The effect of the ingestion of plant oestrogens in sufficient quantity—or indeed of any other animal hormones that may exist in plants—is to upset the balance of the animal's own natural hormones, thus giving observable pathological effects. Under the present British systems of management it appears that this seldom occurs, although the increase in teat length sometimes seen in wethers grazing red clover is an example.

It is clearly important that research on oestrogens in pasture plants and on the animal's own hormones should proceed together.

G.S.P.

Agricultural Science for Schools and Colleges. E. C. HEWITT and D. J. BRAZIER. Crosby Lockwood, 1968. 18*s*.

Although farming is man's oldest occupation, agricultural science, as a specific field of systematic inquiry and experimentation, had a late start compared with other areas of knowledge. But the pace of its progress in the past 150 years, and particularly in the last quarter century, has been little short of phenomenal. Young people contemplating a career in agriculture today are no longer thinking of some indeterminate rural way of life, but of a worthwhile specialist occupation.

In the course of the swift technological changes which have reshaped farming thought and practice, it was perhaps inevitable that agricultural education should have lost some sense of its direction. The Pilkington Committee put its finger on that. It follows, therefore, that within a revised framework of agricultural education new text-books must replace the old and an earlier preparation devised for specialized study.

This new book by E. C. Hewitt, of Kirkby Fields College of Education, and D. J. Brazier, of the Warwickshire Farm Institute, is a good example of the kind of *aide* that can usefully be given to the aspiring young farmer of the future. It is soundly based on the principles of applied physics, chemistry and biology, and will be of undoubted value both to those taking up the study for the first time and to those who are ready to translate fundamental principles to agricultural application.

In the latter category individual sections deal with The Plant, The Animal, Environment, Beneficial and Harmful Organisms, and Chemicals in Crop Husbandry, and the authors' treatment of them is as concise as it is informative and stimulating to further study. The attention given to the ecological factors, so often either omitted or minimized, deserves special mention, in that it is the key to the co-operation between man and nature. So, too, does the chapter on genetics in plant and animal breeding—a subject frequently daunting in its presentation, but here simply explained.

Much has been achieved in this book of 300 pages, plus glossary, index and a list of supplementary reading; and its modest price brings it well within the young student's reach. We could do with more books like this. *S.R.O'H.*

books received

Labour Turnover. A manager's guide to action. Copies from the National Economic Development Office, Millbank Tower, 21-41 Millbank, S.W.1.

A Strawberry Cultivar Trial at Six Centres, 1965-1967. Brogdale Farm. Ministry of Agriculture, Fisheries and Food.

Fruit. No. 17. A Review of production and trade relating to fresh, canned, frozen and dried fruit, fruit juices and wine. Copies from the Commonwealth Secretariat, Dept. P.D.D., Marlborough House, Pall Mall, S.W.1. 40*s*. (by post 42*s*.)

Journal of the Royal Agricultural Society of England. Vol. 129. John Murray, 1968.

Know your Broadleaves. Forestry Commission Booklet No. 20. H. L. Edlin. H.M.S.O. 15*s*.

Forestry in the Weald. No. 22. Forestry Commission. H.M.S.O. 3*s*. 6*d*.

Forty-eighth Annual Report and Accounts 1966-67. Forestry Commission. H.M.S.O. 10*s*.

British Sheep (Revised Edition). National Sheep Breeders Association, 1968.

Farm Buildings and Fire Hazards. Report No. 11. Copies from Farm Buildings Centre, National Agricultural Centre, Kenilworth, Warwicks. 12*s*. (including postage).

M.M.B. Beef Testing Centre Warren Farm. Autumn, 1968.

Farming in the East Midlands. Financial Results 1967-68. F.R. No. 169. University of Nottingham. 6*s*.

Requirements for Effective Planning in Agriculture. (Twelfth Heath Memorial Lecture). Asher Winegarten. University of Nottingham. 2*s*. 6*d*.

Some Economic Aspects of Increasing Size of Dairy Herds and Modernising Dairy Systems in the Northern Region. Report 170 M. University of Newcastle upon Tyne. January, 1969. 3*s*. 6*d*.

Some Features of Dairy Farming in the Far West. V. H. Beynon and E. T. Davies. Report No. 172. University of Exeter. 5*s*.

The Ministry's Publications

Since the list published in the February, 1969, issue of *Agriculture* (p. 84) the following publications have been issued.

FREE ISSUES

ADVISORY LEAFLETS

No. 291. Black Scurf and Stem Canker of the Potato (Revised)
No. 321. Eyespot and Sharp Eyespot of Wheat and Barley (Revised)
No. 404. Heating of Grain in Store (formerly Heating of Grain) (Revised)
No. 441. Nitrogenous Fertilizers for Farm Crops (Revised)
No. 442. Phosphatic Fertilizers for Farm Crops (Revised)
No. 461. Stem Eelworm on Tulips (Revised)
No. 562. Rabbit Meat Production—Feeding of Meat Rabbits (New)
No. 563. Egg Storage on the Farm (New)

SHORT TERM LEAFLETS

No. 56. Keep Your Own Poultry Records (Revised)
No. 80. High Nitrogen (New)

UNNUMBERED LEAFLET

Cyanide Gassing Powders (Revised)

Single copies of the above free items are obtainable from the Ministry (Publications), Tolcarne Drive, Pinner, Middlesex.

ACKNOWLEDGEMENT OF PHOTOGRAPHS

Front cover and p. 117 *Architectural Review*. P. 107 Welshpool *County Times*. P. 110 H. E. G. Morgan. P. 118 J. B. Weller. P. 122 Turners Asbestos Cement Co. Ltd. P.126 J. D. Young. P. 137 William Tribe Ltd. P. 143 E. Dunmore.

AGRICULTURE

Price 1s. 3d. net monthly (by post 1s. 9d.)

Subscription Rates, Home and Overseas: £1 1s. 0d. per annum (including postage).

Subscriptions may start with any issue and should be sent to:

HER MAJESTY'S STATIONERY OFFICE

49 High Holborn, London W.C.1
13a Castle Street, Edinburgh 2
Brazennose Street, Manchester M60 8AS
109 St. Mary Street, Cardiff CF1 1JW
50 Fairfax Street, Bristol BS1 3DE
7 Linenhall Street, Belfast BT2 8AY
258 Broad Street, Birmingham 1

Single copies can be purchased from any of the above-mentioned addresses or through a bookseller.

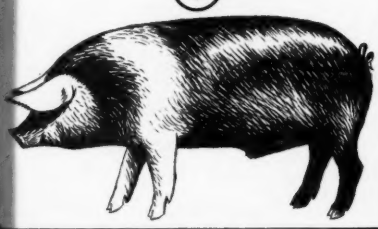
Printed in England for Her Majesty's Stationery Office
by Hull Printers Limited, Willerby, Hull, Yorks.

(K90) SBN 11 720760 8

THIS LITTLE PIG WENT TO MARKET

It might have gone 10/14 days earlier and saved 50-lbs of Meal if its rations had been fortified with "MACKECHNIE" Brand Copper Sulphate Fine Crystals—a grade of Copper Sulphate specially prepared for use in animal nutrition.

For details of the uses of Copper Sulphate write to:
McKECHNIE CHEMICALS LIMITED,
P.O. Box 4, Ditton Road, WIDNES, Lancashire, England.



CERTROL
CERTROL
CERTROL

For Mayweed and other resistant weeds

WEEDAZOL
WEEDAZOL
WEEDAZOL

For Couchgrass, stubble and perennials in orchards

PRODUCTS OF RESEARCH
FORMULATIONS

Marks

A. H. MARKS & CO. LTD., WYKE, BRADFORD, YORKS
Telephone: Bradford 676372
Telegrams: Colour Bradford

TAS/MK84A

MINISTRY OF AGRICULTURE, FISHERIES AND FOOD

Plant Pathology

A quarterly publication presenting original contributions on plant diseases, plant pests, rodent and bird damage, nutritional and physiological disorders of interest to the mycologist, entomologist, helminthologist, soil or nutrition chemist, plant physiologist and meteorologist

Single copies **7s. 6d.** (by post 7*s.* 11*d.*)

Yearly subscription **36s.** (including postage)

Published by

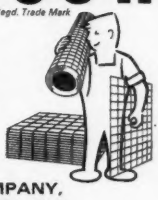
HER MAJESTY'S STATIONERY OFFICE

and obtainable from the Government Bookshops in London (post orders to P.O. Box 569, S.E.1), Edinburgh, Cardiff, Belfast, Manchester, Birmingham, and Bristol or through any bookseller

Weldmesh

Regd. Trade Mark

IN ROLLS, SHEETS AND CUT-TO-SIZE PANELS



Direct from:
THE B.R.C. ENGINEERING COMPANY, STAFFORD *Telephone: STAFFORD 4441*

EVENSTORM IRRIGATION

★ Rotary sprinklers ★ Rain guns
★ Organic irrigation (effluent disposal)
★ Portable aluminium mains
★ Glasshouse and outdoor spray lines

EVENTHERM SPACE HEATERS—

Portable, oil-fired, up to 200,000 B.T.Us. Thermostatically controllable for frost protection in potato stores, etc.

Details from EVENPRODUCTS LTD., Evesham, Worcs. Tel. Evesham 6633/4.

Ministry of Agriculture, Fisheries and Food

SELECTED PUBLICATIONS

Dairy Floors

Prepared by a sub-committee of the Milk and Milk Products Technical Advisory Committee, this report will be of interest to everyone concerned with the dairy industry. Architects, builders, plant designers, management and dairy technicians will find it a useful guide to all aspects of dairy floors. The main subjects covered are design; materials available; special considerations for various parts of the dairy; maintenance and repair. It contains a good bibliography. Illustrated.
8s. (8s. 6d.)

Farm Buildings Pocket-Book

Since the first edition of the Pocket-book was compiled there have been many developments affecting the accommodation of livestock and the storage of produce and materials on the farm. This revised edition gives what are accepted generally as the standards applying today.
3s. 6d. (3s. 10d.)

Commercial Glasshouses

This revised and illustrated bulletin deals comprehensively with the many developments which have taken place since the third edition was published in 1960, a time probably of more rapid change than in any similar period in the history of the glasshouse industry. Choice of site and nursery layout, glasshouse types, construction and materials, are all fully discussed, and in addition to advice on ventilation, considerable attention is given to the requirements and various types of heating systems. (Bulletin No. 115)
10s. 6d. (11s. 7d.)

Bulk Storage of Potatoes in Buildings

Discusses the siting, design and construction of buildings for the storage of potatoes in bulk. This illustrated bulletin also deals with insulation and ventilation and the questions of mechanical handling and managing the crop from the time it is put into store until it is marketed. (Bulletin No. 173)
4s. 6d. (4s. 10d.)

Prices in brackets include postage

HMSO

Government publications can be purchased from the Government Bookshops in London (post orders to P.O. Box 569, S.E.1), Edinburgh, Cardiff, Belfast, Manchester, Birmingham and Bristol, or through any bookseller